Bleasdale Computer Systems Ltd. XENIX In proceeding the Bleasdale 600 micro Telest coorders.

Thursday, March 4, 1982



PREPARATION

putch your peak loads, file g-epsorregular work on

Peter Merrick

RM EUROPE has announced its

third package of price rises in nine souths in the face of falling sofftability on its overseas business. Last year the corporation lost

\$600 million of profit due to the strength of the dollar on international exchanges.

Lease and rental charges for a

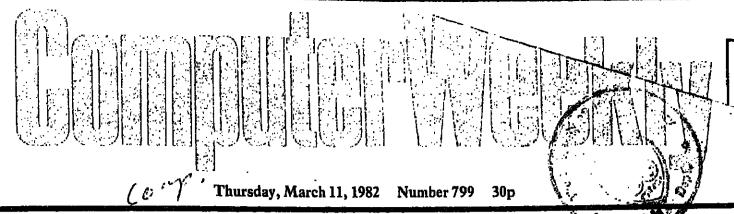
broad range of IBM products in the UK went up by 8% from

March I. The exception was large mainframes, and the System 34 and System 38 small business

up by 5% in most cases and 10%

maintenance charges on its

THE ADVANCED **FERRANTI**



NEWBRAIN **FROM**

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Sixty UK IBM programmers join brain drain

THE first-growing market in the US for UK contract staff has brought 60 appointments for IBM programmers and analysts in Ken-

The British team will leave during the next few months to implement a large life assurance project, following a deal signed in the New fear between the London-based VLI Group of contract agencies and US insurance conglomerate Capital Holdings (CHC).

Interviews for the 60 vacancies are now being conducted in Lon-don by six CHC technical staff can expect to make \$40,000 a from a pool of applicants from VLI's reservoir of 12,000 contractors and from recent advertise-"This is the biggest US

contracting coup. I know," says VLI marketing director Anthony Lamble. There are at present only about 400 UK contractors working in the whole US, he says.
The project with CHC is ex-

pected to last 18 months and could provide over £2 million revenue will be filled contractors.

IBM-based insurance system for another US company, Informatics. "We are therefore looking mainly for Cobol and IBM Assem-bler people," says Jim Hayes, CHC's head of Information Systems and Services.

The minimum requirement is for people with between two and five years' experience, who will earn around \$25,000 in the first year. "There are plenty of people at home in the US with less than two years' experience." comments

Hayes.
More experienced contractors year, while people with 15 years' experience in IBM operations, with CICS to boot, may top

For UK contractors to get work permits in the US, it has to be shown that there is difficulty in finding the right people locally. With 100,000 more jobs than people in the US computer industry, this was not a problem.

Hayes is confident the vacancies will be filled from VLI's pool of

报 机热热器

AMERICA . . . attracting growing numbers of contract computer workers.

Tax changes will test software suppliers by Cliff Dilloway IMMINENT changes in the method of calculating PAYE will soon test the abilities of numerous small software houses which have been formed in recent years to supply software packages to microcomputer users. The last significant changes in the last significant changes in the tax formula rotal place in 1972. The last significant changes in the policy committee, and BCS would welcome metint the tax formula rotal place in 1972.

The last significant changes in the tax formula took place in 1973. Since then, small computers for payroll programs have been

While the changes in themselves are not particularly complex, they will necessitate a recompiling of existing payroll programs. That raises the logistical problem of distributing copies of the new programs to users.

Date for implementation has not been announced, but it is expected to be co-ordinated with any changes in tax rates or bands that may result from the budget on March 9.

microcomputer software is sold through dealers, and according to David Lowe, manag-ing director of ACT Microsoft, distribution is to a large extent de-pendent on how good, or bad the dealer is in terms of keeping lists of customers. But Lowe adds that he does not think there will be a prob-lem, particularly if enough time is

involvement to ensure the change

are made smoothly.

The changes in the payroll of culation are contained in an Infant Revenue publication, Notes of PAYE for Computer Users, selections. six, number 11. The first change reflects a modification to the she of the table used to arrive at in free pay in manual tax calculations, and will probably only necessitate the alteration of a con-

The second change involve rounding of tax free pay, which has been rounded upwards to the nearest five pence. It will now be rounded up to a penny. The change too will probably only affect constants, rather than the

means of overlays. Changes in the formula for calculation call for different response, and it is the speed and smoothness of that resgiven to make the changes.

The Inland Revenue has consulted the Payroll Policy Committee will be looking to.

The Commerce Departmen

burden of the rises heavily on the 4300 series and its terminals and peripherals, from which it gets nost of its rental revenue.

nine months

It has not increased the rental changes for the large systems, including the 3081, because most of these are sold outright. Given the relatively small number installed. price and rental charges have a small impact on total business. Bu the 4300 has been very successful with over 1,000 systems in the UK according to some estimates.

The users of large systems do not escape entirely however. They will pay 5% more for both main-tenance and licensed software on top of the rises announced in Octo-

on some items of equipment, and program product fees are up 5%. IBM last increased its prices in Other 1981, when prices on the quarters of its licensed soft-The rise in the price of program products continues the recent trend in that direction. Since there is very little competition in the IBM system software market the company is increasing its prices in line with what the market will

600 series machine went up 10%. Mainframes on the 303X series of maintenance rose by 15%. Only the top-end 3081 was exempt. The The software increases are parti-Previous price rise was in June.

1BM attributes the latest rises to cularly stark in light of last October's rises, and the change in prichigh rates of inflation and the level of interest repayments. The rise of the dollar last year cost it heavily, ing policy announced last November when the new top-end 3081K machine was introduced.
At that time IBM began to price pericularly on its lease/rental deals. The company has put the

like its Time Sharing Option, separately. Previously TSO was available as part of the MVS system control program.

The company announced at same time that there would be installation charges for certain items of software. The cost of changing from a multiple 3033 system to several 3081s was then put at as much as \$1.5 million over two to three yers in installation changes and migration aids. The latest rises add considerably

The recent price cut in price of the System 34 in the US has increased speculation that IBM is preparing to drop the machine, ready for the launch of a System 38 based replacement. The company cut the price of top models in the System 34 range by about 10%. It also announced volume discounts of between 6 and 9% on all models of System 34 and System 38. IBM UK cut the price of System 34 by up to 21% in February, and the up to 21% in February, and the machine was exempted from the general round of price rises annunced last week.

GIBM balance sheet sickness

asked to put up the money. Orrock accused the clearing banks of "no hived off intact to system supplier Data Logic for an undisclosed price, but its international division has still to find a buyer. understanding how one does business in the Middle East", and eventually put up the money from

Computer Resources went into receivership on Tuesday of last

receivership on Tuesday of last week under the combined strain of funding a huge Saudi Arabian contract and a very tight loan from the Industrial and Commercial Finance Corp.

But by Friday the receiver at Cork, Gulley & Co, Michael Jordan, was able to announce the sale. He had been called in by Computer Resources founder and chairman Ian Orrock to dispose of a company which turned over £3.25 million in the year ended December 1980 with profits of over £250,000. The results for 1981 will see turnover of over £4 million but profits unchanged.

The company san into trouble because of slow payments on a huge £2.5 million contract it, won last April in Saudi Arabia. The contract calls for a 4341-based system to be developed for the

system to be developed for the Sandi Arabian General Presidency of Youth Welfare and has seen

software house retain the business and a £130,000

by Kovin Cahill IN what must be one of the performance bond demanded the Saudis has been called in. shortest receiverships on record, software house Computer Resources has been sold to US-based United Computing.

Its bureau interests have been bired off interest to system supplier. The bond was the subject of row between Orrock and the Nat-West Bank which was originally

> within the company.
>
> Some 190 of the existing 200 staff have been offered jobs by the

NEWS BRIEF Supermarket system trials next year

A MAJOR new supermarket point of sale system from ICL has been developed in conjunction with a consortium of European retailers, including Sainsburys. Provisional codes have been placed, and deorders have been placed, and deliveries will start at the end of the year to enable customer trials at the beginning of 1983.

An extension of the 9500 series, the system includes laser scanning.

Disagreement

THE new technology agreemen between the civil service unions and the government seems set for rejection. Although the Council of Civil Service Unions will not vote until next week, the Society of Civil and Public Servants' Executive, the second largest civil service union, has already rejected the draft by a narrow margin. A two-thirds majority positively

DG launch

Quick sale saves PREPARING the way for an April UK launch of its Enterprise 1000 desk-top 16-bit microcomputer, Data General has appointed Manchester-based Search Computers as a stock holding distributor. In the first year it is siming to have about 20 dealers in the North of the UK. A distributor to cover the Southern half of the country will be appointed by Data General in a be appointed by Data General in a

Fastest in West

THE fastest-growing data processing industry in the West is to be found in the Republic of Ireland, where growth has reached 35 per cent. From a small base the country has vigorously promoted itself for both manufacturing and ser-vices. Report page 22.

More relational promises

17

101

The state of the s

EX-STOCK

the way microcomputers are used. Electronic Office Services plans

to launch a relational type database system which it says will cut softwhre development time by as much as 75% and reduce costs by

The system is based on Micro Data Base Systems MDBS 3 database with applications software developed by Riestronic Office Ser-

Diablo offwetti Hazeltine trass to

• 7x 14 dot matrix

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01-83665

interface

Green phosphor

Buffered printer

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mode transmission

TIL MOOR SUMMED CENTRODICS E B Diablo olivetti Hazeltine い

TERMINAL CHOICE

Govt gives thinking on The database will be sold as part A SMALL London-based of a package including application software for the new generation of tancy is about to launch a system which it claims could revolutionise Sirius and IBM's Personal Compusatellite broadcasting

by David Craver HOW soon individuals in the UK will be able to use computer termi-nals to bank and shop from home could be determined by an an-nouncement in the Commons to-day by William Whitelaw, Home

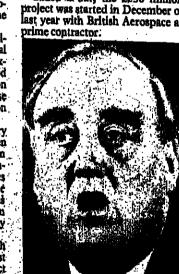
Government intentions for satelbroadcasting and a national able television network are expected to be clarified, and a flood of investment could hinge on Whitelaw's willingness to release the Home Office's stranglehold on cable and satellite transmissions.

The Department of Industry

and private industry have been pushing for an open market in cable distribution networks and satellite and radio links. References have been made to the US cable television network, which has shown tremendous expansion since its deregulation in the carly

Baker said in the Commons last week that opportunities for direct broadcasting by satellite and cable television were enormous in terms of investment and job creation.

He said that British Aerospace is making 10 space saidlites at the



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EEC to pursue IBM case

THE BEC case against IBM is to continue despite pressure from the IBM's acquittal.

Representatives from the US Commerce Department at an internal hearing in Brussels last week urged the Commission to about 10 cial to IBM's business.

moment and that the UK is in the preliminary stages of making what would be the largest and most powerful satellite of the 1980s.

Called L-Sat, the £230 million trolect was stayted in December of

urged the Commission to abandon The case will its case since similar charges second hearing DIGICO COMPUTERS



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ICL moves to reshape more of its marketing strategies

Nexos buy slots in as 7700 replacement

INSIDE THIS WEEK'S ISSUE

by Boris Sedacca

CL is to announce significant eninnements to its office automaits products which will include
entworking on its newly-acquired
Nacoi 2200 word processor and
new models of its 7700 series infemation processor.

would fit in with ICL's existing 700 information processor, based in ICL 7502 cluster controller. the 7502 is an ageing piece of sulfansin and it, was rumoured but ICI would drop it to make my for the Nemos 2200. However, he 7502 is a synchronous communications stations device designed specifi-ally to hook up with ICL

machines using CO2 and CO3 protocols. These facilities are not available on the standard Nexos

available on the standard recass
2200.

The Nexos 2200 is essentially a
standalone device with limited
communications facilities whereas
the 7700 provides integrated office
automation facilities including when CL acquired the marketing rights to the Logica-manuscutured Nexus 2200 from the State and S

nected to it.

But ICL plans to bridge the gap
when it announces networking
facilities to ICL mainframes News, 2200. facilities to ICL mainframes within a month's time on the Nexos 2200. This would effectively kill off the 7700 information processor. Plans to follow this up with the announcement of a new and enhanced 7700 which will use up to date technology are well advanced.

Software commercial

by Andrew Thomas

ICL's in-house DP department set to market applications software developed for its own use. Corporate Information Systems (GIS) is now part of ICL's services group, with Baric and the remains of Dataskii, and for the first time ir is being tapped commercially.

The department is also building

spares, orders and corporate reporting, which is planned to
operate in all countries where ICL
is active. The system is already in
tise for South Africa, Australia and
most of Europe via dist-up links.
The system tises standard PTT
networks, and it is ICL's intention
to develop the network as the company moves into new territories.

pany moves into new territories.

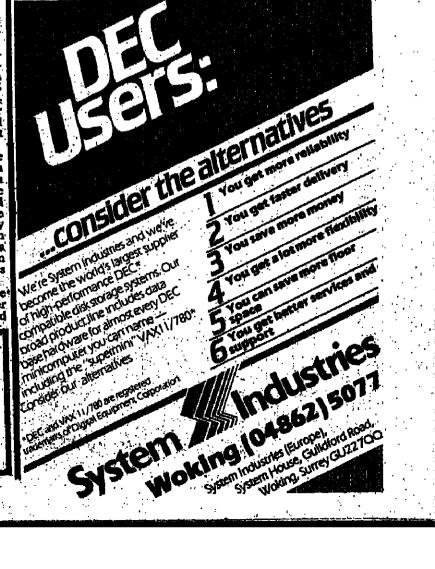
Trop case against IRM' Free Scharanaky call...

Software File ... Micro News....

Puzzier Op Spot People/Diary Products

of Youth Westere and has seen Computer Resources move into a new so-called Arabic data centre in Woking where Arab programmers have been hired to help write it.

There are doubts whether the contract is still viable. Computer Resources has already renegotiated Jobs: Page 28/47



Premier siler MI5 secret autabank to store cords on 20m people'

OPPOSITION MPs have reacted angrily to the refusal by the Prime Minister and the Leader of the Commons to comment on reports that MI5 is operating a massive computer system capable of storing records on 20 million indi-

week's New Statesman on a gigan-tic secret databank set up by MI5, with a storage capacity two-and-a-half times as large as the already



The cost of the installation is estimated to be between £15 and £20 million and to include dual ICL 2980s and 100 disc drives each with a capacity of 200 Mbytes. Such a store would be sufficient to bed passent dual to the installation is an independent data protection authority.

Bob Cryer (Lab, Keighley) asked how the Leader of the House, Francis Pym could answer

It is further alleged that MI5 has authority to tap into other government databases, in particular those at the DHSS, DoE and Inland Revenue, in contravention of all the government's promises on

Although the Ministry of Defence confirmed that computers were being used by the intelligence services, Mrs Thatcher stuck to the formula that it was a long hal-lowed tradition that Ministers did

Later Labour MPs said that while no one expected the govern-ment to talk about the details of the security service's work MPs were entitled to have answers about the principles involved, including whether MI5 computers were linked to the records in other government descriptions. government departments and the Inland Revenue.

The issue was raised in the Commons by Michael Meacher (Lab, Oldham West) who drew attention to the report which alleged that MI5 was also given unlimited access to other government department files which they had been using to build up a comprehensive national filing system on each indi-

Cryer demanded an urgent Leader of the Commons was not

nisation is still working out standards for networking which include data encryption at every level, but that does not prevent snoopers from taking short cuts in the meantime, especially if the target installations are unaware of the need to protect themselves from remote (not just internal) unauthors.

using for its massive databank, can also supply to its customers net-working facilities under the VMB operating system. These allow transfer of files between machines and remote access between terminals and machines, but are certainly not of the sophistication that MI5 would require to "borrow" data from other organisations, par-

A RESCUE package for cash-short
Magnuson, the IBM plug-compatible mainframe maker, has been
agreed by the company's backers
and the Bank of America.

The formal anchors will be a sourced by the company's backers

The formal package will need to inject at least \$5 million into the company. It is due for signing by next Monday.

Magnuson, which has a major OEM deal with memory maker Storage Technology, began to announce serious losses at the end of last year. So far those losses come

n, which has a major

\$31 million for 1981 and the company was predicting a further loss the rescue.

01-661 3122

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Meacher asked if this meant that 1984 had already arrived. He job is "intelligence", it would be asked the Prime Minister to ensure that "this monstrous intrusion" was checked by legislation which

Bob Cryer (Lab, Keighley) asked how the Leader of the House, Francis Pym could answer million people, if these consisted of about 150 words, says the New Statesman. cribe the growth of massive com-puter facilities at the Mayfair headquarters of the secret police service which were not held ac-

prepared to concede either.

Claire Gooding adds: Privacy of information has always been a hot potato in the networking field.

The International Standards Organization is still marking the privacy in still marking the potators.

ICL, manufacturer of the 2980 machine that MI5 is said to be

ticularly without consent.

Most people accept that a totally secure installation is an unattaina-



London hospital to run distributed computing trial as NHS 'guideline'

by Donald Kennett

LONDON's St Thomas' Hospital is to run a distributed computing trial designed to provide guidelines for computing strategies throughout the National Health

itals that ran large experimental health care computing projects in 1972, when it acquired a Xerox Sigma 6 mainframe. It has now decided to take the distributed computing route in replacing this system and will transfer applica-tions running on it to machines in the departments most closely con-

of \$10 million for next quarter.

Following the failure of talks between Magnuson and Storage Technology the company has revised this loss forecast upwards

At one time plug-compatible manufacturer National Advanced Systems was understood to be in-

terested in acquiring Magnuson, but this fell through.

Computer industry watchers on Wall Street originally predicted that the stockholders, including

that the stockholders, including Schlumberger subsidiary
Pairchild, which helds 20% of the

DISPLAY ADVERTISING

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ADVERTISING PRODUCTION

This week it is installing an Ungermann-Bass Net/One Ethernet-compatible local area network supplied by Thame Systems. The network, costing £67,000, will initially have 100 V24 terminal ports on five nodes.
One of the nodes will have a network configuration facility on

it, to download software into the attached devices each time the net-

The first devices to be attached will be the Sigma and its users' terminals, followed by other existing machines such as the diabetes clinic's machine from MicroAPL.
St Thomas' director of comput-

ing, Dr Adrian Stokes, who also advises the King Edward Hospital Fund for London on computing in health care, said the system involved distributed transaction processing rather than a distributed operating system. But the have to know much about the net-

many standard higher level network communications protocols as possible, starting with the Yellow Book Transport Service and the Blue Book File Transfer Protocol developed by the PSS User Fo-

A WORD processing addition to

IBM's System 23 desk-top business machine will bring users facilities in line with those offered by Digital Equipment on its DEC-

It will be available in June to owners of System 23s with at least 64 Kbytes of memory and 0.6

Mbytes of diskette storage. The price is £822 exclusive of VAT.

The option will enable text

processing needs such as mass mailing to be integrated with busi-

Thursday

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March 11, 1982

ness applications.

Until now IBM has kept its or for larger organisations in new word processing and small busi-

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interfaced to outside neural such as the telephone network at possibly British Telecon

SwitchStream 1 (formerly PS), for access by GPs and to other computing facilities.

A replacement mainframe we ruled out at an early stage in the hospital's planning. A data PARS was the main alternative to a kel network. An Ethernet-companie system was chosen in the emen. system was chosen in the expen-tion that Ethernet would become therefore have many manufacture ers making equipment competible with it. Reliability was another

be done over a number of year a a phased way," said Stoke,
"Users with their own mixes will
be able to hook them on in a min-

control characters to enable con-

plex print specifications to be met

The System 23, which was re-leased in August 1981, is IBM) second generation desk-top bus-ness computer and costs shot

100,000 circulation - the highest ABC

figure of any computer Journal in Britain

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secretaries, menagement servic tives, civil servents responsible i

Magnuson rescue plan WP for the System 23 option does not give users the full power available with the Displaywriter. But it offers us of margins and tabs and allows at to be moved in blocks. Also formats can be stored using invibit

or four telecommunications transponders each providing a capacity of about 30 Mbits/sec equivalent to 500 digital speech circuits, compared with the UK's access to a share of one of the six transponders are the Escape to see the six transponders are the Escape to see the six transponders are the Escape to see the seed to see the see

Ruropean Communications Satellite, both due to be launched next
year. The primary application
will be to lease circuits to organisations requiring deliveries of information to many destinations at
cace; for example, a distributed
printing operation for a newspaper
publisher. But British Telecom Intenational managing director Jim
Hodgson said the aim was to provide the flexibility fo suit a variety
of markets.

year, more than 90% of reservists

US urges Brussels to drop case against IBM

by Kevan Pearson
THE EEC's case against IBM, over alleged unfair trading practice in Europe, took on a new aspect lest week when it emerged that the lest we lest week when it emerged that the US government had sent represen-

tion as an example of the US judic-ary's traditional view that only US urts should take action against

The hearing was held at IBM's request for the submission of verbal evidence, and was attended by Sherman Unger, general counsel for the US Department of Commerce — a senior lawyer. Unger was there as an observer, says a spokesman for the Commission, and took no part in the hearing.

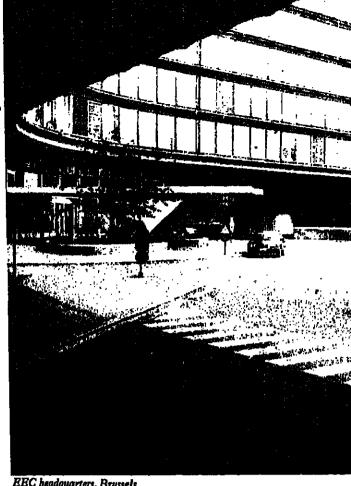
A spokesman for the US Embassy in London confirmed that the US government has "an interest" in getting the case mainly in the US, then it is the US courts which should decide what action to take. Since the US has dropped its own case against IBM, it is natural that it should seek that others do the same, he added.

in getting the case dropped, though it appears that my intervention by Unger was on until the first customer shipments

This argument ignores the impact IBM's policies have on its users, and the users of IBM compatible equipment. The plug compatible manufacturers, who are responsible for the complaints being investigated by the Commission, argue that IBM's actions restrict competition, and that in the and the EEC has consequences for our relations with the EEC." A US lawyer with experience of not surprised that the US would trict competition, and that in the case of a new product announcelike the case to be dropped, following the recent Department of Justice decision to end the 13-year anti-trust case in the US.

He said the traditional US attiment they are unable to design competitive products until IBM releases technical information,

> continues. There will soon be a further hearing at which IBM can add further evidence in its de-fence. This is scheduled to take place later this month or in April, and will effectively close the investigative phase of the case. After this, neither party will be able to introduce fresh evidence. The Commission's internal decision are Commission's internal decision a



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Telecoms regulation planned

by our Parliamentary Correspondent

THE government is considering setting up a new agency to regulate competition in telecommunications, following the recent decision to issue a licence for Mercury, the first rival telecommunicatio

Industry Secretary Patrick Jen-kin believes that now British network has been thrown open to competing firms which can offer a variety of services to the customer, the door is open to private risk

ment.
The Minister told Conservative at a party meeting at their London headquarters that his department is considering whether this new competitive environment would

agency to hold the ring.

He said he did not believe it would be appropriate for British Telecom to perform the function. because it is an interested party. A new agency under Ministerial control manned by people with technical expertise and commercial acumen might be needed.

UK satellite will open up business comms

y Donald Kennett

THE UK's satellite-based digital business communications capacity is to be greatly expanded by the bunch of Britain's first independent commercial satellite at the

abining telecommunications

higher return in the short term.
The project was announced last week by a consortium of British Telecom, British Aerospace and GEC Marconi, hot on the heels of the government's decision to

the whole of Europe and the east coast of the US. It will have three ransponders on the French satel-ite Telecom 1 and two on the

tives in authorising a UK ea-is to give UK industry a boost in export markets, where Bridsh Aerospace believes there will be a demand for between 50 and 100 satellites and their asso-cated equipment on the ground.

comes along, we intend to win."
Finance for the project, expected to cost about £150 million for three satellites including a spare in orbit and a spare on the

Intelsat and Eutelsat, the interna-tional regulating bodies for satel-

its confidence in getting the first satellite up by the end of 1985 in naming it Halley 1, because Hal-ley's comet will be visible at that

Satellite Business Systems in the US spent \$400,000 getting its first



Dad's Army head count

oyour Parliamer

A COMPUTER-based individual system. Nott says he intends eventually to expand the scheme to cover more than 50,000 men and women, when a pilot scheme for the creation of a new Home Service Force, or "Dad's Army", is started in September.

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ICL extends its clustered terminal range

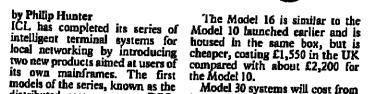
models of the series, known as the distributed resource system, DRS,

Model 30 systems will cost from £3,800 for a basic configuration

grab business from users of competitors' mainframes in local networking, and to replace the popular but ageing 1500 computer.

The new products are the DRS 20 Model 16 Interactive Video terminal, and the DRS20 Model 30 terminal cluster system. Both incorporate ICL protocols and will phase out the 7500 this year.

"We are always facing competition from small companies in this area, but I think they will have difficulty matching the prices of these new models based on components with the earlier ones," claims an ICL spokesman.



The earlier models in the DRS

range were the 10, 40 and 50 based on the 8-bit Intel range for an at-tack on distributed resource

The Models 16 and 30 are controlled by new versions of the Distributed Resource Executive software, DRX, which provides screen and keyboard control, local validation, data editing and facili-

ties for networking.

Printed circuit boards for the new models are being built at ICL's plant in Kidsgrove and assembled at Letchworth, where the old 7500 series is now built.

'Big Brother' security system arrives in UK

by Kevan Pearson A BIG Brother security monitoring system that can continuously track a person's movements is being marketed in the UK by Systemsolve and Photoscan. The system, made by Holland-based Nedap, is designed to monitor the whereabouts, in a building or complex, of employees and visitors.

To track a person it is necessary that they carry a pass card which is electronically monitored at doors, and the information is passed on to a Sperry Univac V77 computer.

The system, called Vortacs, relays real time information to the computer which then decides whether the pass being monitored has the right of access to the part of the building where it has been picked up. If not, access is denied, The pass is automatically recogtrack a person's movements is be-

The pass is automatically recognised when it comes within 70cm of a control point, usually a door. It will be activated whether the card is carried in a pocket or a bag.
Using the information obtained in
this way Vortacs constantly monitors the movements of individuals as they enter, move around within,

Rach pass is individually coded with an identification code and access authorisation. If a manager wants to find out

where an employee is he can ask the computer to find out which control point was last activated by that person's card. And it can produce lists of who is on the site

It can also be linked to the payroll system to provide real time monitoring shift and flexitime use, and can be used to switch off heating and lighting when no one is in a room. Using additional software it can be linked with a closed circuit television system.

There is even a functional software it can be linked with a closed circuit television system.

prevents a card from being used for going through the same control point twice in the same direction without having passed through a point in the reverse direction between them

The typical price for a system with 10 control points and 1,000 access codes would be about

No system is foolproof. however. If two people work in collusion, and one of them has a pass, then provided both parties go through a door together the system can do nothing. But stolen cards are no longer a major problem.

Because the identification code is unique, as long as the loss is reunique, as long as the loss is re-ported immediatey the system can be told that the code is no longer

CSA calls for privacy

The CSA has voiced the growing concern that British industry could face sanctions from other members of the Buropean Community tinless the Council of Europe's Convention for the protection of privacy of the individual is ratified by the end of this year.

Home Office Minister Timothy Raison has indicated that the government is coming around to the view that there should be an independent registrar for computer systems which handle personal is the control of the computer systems which handle personal diles.

Ombudsman

by David Craver
WITH the off-repeated call that a government White Paper on data protection is overdue, the Computing Services Association has released its own position paper which calls for an independent White Calls for an independent Combudaman to oversee personal data administration.

The CSA has voiced the growing concern that British industry could be guipment PDP-11/24s running Equipment PDP-11/24s running Equip

The CSA proposals for legistic digital VLSI, very large scale like The CSA proposals for legistic digital VLSI, very large scale like grated circuits.

Or Give individuals the right to privacy of information and legal protection against its misuse;
Or Require registration of personal files, except common operating files, such as payroll;
Or Allow cases of alleged misuse of personal data to go to court.

DG for Britvic

BRITVIC has installed a £50,000

Data General CS/50 supplied by Dutel Business Systems of Loadon to provide purchasing, supplied and other management information via terminals or a microfiche purchasile.

SALES BRIE \$3m graphics order from Ford

FORD Motor Company by ordered 210 vector graphic workstations, costing \$3.5 milina from Lundy-Farrington, the European subaidiary of the ly company Lundy Electronics.

The recently-launched UltraGraf workstations.

UltraGraf workstations, which contain up to 192 Kbytes of balls and screen memory, will be used in Ford's UK and West General factories for car body, engine at factories for car body, engine at factory layout design, drawing a the facilities of its computer-tide design and manufacturing system both in the US and Europe.

Cobol training

WIRRAL Computer Centre, Liverpool training company, is installed a 500 Kbyte University System 80 with 190 Mbytes of & storage and four VDUs. It plants use the system in a new series of 26-week courses in Cobel programming for 16 to 18 year of students sponsored by the Yout Opportunities Programme, as we as for administrative work.

Allied addition

ALLIED Bakeries is adding further Honeywell DPS 8 da

SHEFFIELD-based engineering computing specialist Day Computing has won a £200,000 expect order from Chemische Werke Huls of West Germany for Compaid, its planning and material control package, for use in con-structing chemical plants

NCR replace

BLECTROLUX subsidiary lumbus Dixon, the Wembley-based industrial floor polisher maker, has replaced its NCR 829 with another NCR machine, an i-

Infra-red gauge

INFRA-RED Engineering of Madon in Bessex has won a £165,000 order from BXL Plastics of Broadborough for infra-red thickness borough for intra-red maxima measuring and control systems. The IB FG4 gauge will be used to measure plastic film 200 micros thick, while the IB DP4 process will produce average thickness and deviation records and set of a alarm if the upper or lower limit are exceeded.

Equipment PDP-11/2/s running software developed on a DEC LS. 11/23 by the CEGB, using its ora programming language Cutss.

VLSI design

ITT subsidiary Standard Telecommunication Laboratories has ordered a Prime 750 to run a suit of programs it has developed for logic simulation and automatic layout in the design of linear and digital VLSI, very large scale integrated circuits.



London campaign to free Soviet scientist FIVE years have clapsed since the arrest of the 34-year-old Soviet served over 12 prison sentences of his subsequent imprisonment for espionage and anti-Soviet agitacomputer scientist Anatoly Scha-12 to 15 days, all without charges, He became a founder member of The campaign for his release is gathering momentum and his case has been put forward as evidence in Moscow which the Soviet

of Soviet violations of human rights agreed at Helsinki, at a meeting currently taking place in Madrid, despite Soviet attempts to beau it off the second. keep it off the agenda.

Now the London-based Soviet activists.

Real graphics needn't cost the earth

Women's Campaign for Soviet Jewry is planning to hold a demon-stration on March 15 to mark the fifth anniversary of his arrest.

working on classified projects but when he applied for an emigration twist to Israel in April 1973, this was refused by the Soviet authorities on grounds of his having had access to classified material.

Yet the computers which Scharausky worked on were supplied by the US under the terms of the Helsinki suppersupplied the Helsinki suppersup Helsinki agreement which stipu-lated that they were not to be used

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WESTWARD

A step in the right direction

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6/10x490 viewable resolution

Scharansky was arrested on March 15, 1977, and was held in-communicado for 16 months.

In May the KGB informed Scharansky devised a computer algorithm for a chess endgame in his master's thesis at Moscow University, an institution he entered at the age of 14.

Scharansky deliberately avoided working on classified projects but

SCHARANSKY . . . 13 years.

egram to Soviet leader Leonid Brezhnev urging that observers from the international scientific and computing community be invited to attend the judicial

a State lawyer to the defence.

In August 1977, the US Association for Computing Machinery urged computer scientists worldwide to break off relations with their Soviet counterparts.

This move was rejected in July 1978 by Professor Donald Michic, head of the machine intelligence research unit at Edinburgh University, who called on Computer Weekly's readers to sign a stend the judicial proceedings.

The trial was held a few days later and Scharansky was sentenced to three years in prison followed by ten years in labour camp.

A bursary for a "refugee scholar" at a British university is to be named after dissident Soviet scientist Dr Andrei Sakharov. The beneficiary will receive three annual payments totalling just over £3,300.



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ilcations and enquiries to:
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CSA push for govt contracts irks unions

by David Craver
A CAMPAIGN to get the UK government to spend more of its data
processing budget with computer
service companies could lead to confrontation with the trade

The Computing Services Association, representing 190 com-panies, has issued the government with a five-point plan which it hopes will change what it says is its "derisory" performance in spend-

ing on computer services.

The CSA plan would lead to big turnkey projects like the Inland Revenue's computerization of PAYE and the Department of Health and Social Security's Camelot scheme being contract out to the private sector.

But Leslie Christie, assistant secretary of the Society of Public and Civil Servants, says: "If private computer service companies are sent in to do government work, will not be tolerated by the

CSA and chairman of BIS Applied

hardware to support its apecialist

nsurance application packages, nternet, of Dorking, is taking on

tions, the American Scientific

The system can support up to

ver can run 62 Mbytes of Winches-

ter hard disc storage, but sub-ser-vers can be added to the network if

more shared storage is needed,

f workstations on the network is

This unique and economic Low Complexity Colour Display developed by Microvitet is a high-performance modular VDU designed to be driven directly from any logic source, to produce alphanument; and graphic displays in sparkling colour with a clarity and legibility unmalched by normal IV monitors or modified broadcast receivers.

LCCD offers a high-

Groome adds.

Data Systems' SDS 400.

System will support up

to 250 workstations

Systems, agrees that the trade unions could be a stumbling block

But he says there is no question of reducing DP employment in overnment, and the estimated 5,000 central government jobs

Graham adds that by working with private service companies, union members would benefit from "technology transfer."

CSA's argument for more government purchases of computer services hinges on its contention that the "UK government trails other major powers in using its position as a customer." It points to the US, where 27% of computer service companies' revenues come from federal or state agencies, and to France, where the figure is in the order of 20%.

In contrast, central government contributes only six to eight per cent in the UK, nearly 13% if the according to a survey of the top 10 .UK service companies. Ministry of .Defence spending does not form agrees, are very sensitive to the

the Central Computer and Tele-communications Agency, the gov-ernment's buying arm, have been looking at ways to increase the par-ticipation of computer service

It will be a month at least before any formal proposals come out of the working parties, but Gerald Watson, head of CCTA, says: 'Yes, I am sure they will get more

That is because there is shortage of resources in the Civil Service, but in any case there are very few projects of any size in which computer service companies are not already involved, he says. There is potential for more busi-

area which has a long tradition in US government departments, but which has only been on offer in the UK over the last few years, he



GRAHAM . . . Government performance "derisory" in spending on computer services.

issue, but a new technology agreement could resolve many of their

Behind the CSA proposals is the belief that government data processing should be systems rather than hardware led. It calls for collaborative projects with gov-

multiple design contracts and the breaking down of big contracts to allow participation of smaller

It also proposes the provision of more information about potential contracts, how they have been awarded, completion dates, and Christie refutes suggestions that

was axed by the new chief execu-

tive officer for European opera-

tions Ron Steorts, the man res-

ponsible for over 20 staff losing

their jobs since last May.

One of them is Tony Yates, formerly manager of CACI's Birmingham office, who has taken his case to an industrial tribunal claiming unfair dismissal.

However, another former staffmember has accepted by

member has accepted his leaving

terms. "I have come to a reasonable settlement with CACI," said Jay Metcaife, formerly in charge of the company's legal affairs.

Throughout the staff departures over the last six weeks neither

civil servants might benefit for "technology transfer" by work, with private firms. He say a pertise within the civil services good as that in the private scar He would also like to costings to justify claims by the CSA.

the rest of the world. It previously chip design for the Ethernet nisation's seven-layer model for controller and is planning to GPIB general purpose interface bus into the IEEE 488 standard fore the end of the year. DEC too be insufficient on their own to they want a greater cake," he says. Xerox got together with Intel layout between the transceiver and and Digital Equipment two years to promote Ethernet as a "collision detected" signal, the

Getting in on the 16-bit act

by Robert Parry
SOFTWARE houses eager to go
in on the 16-bit microcomputer at
are racing to bring out applicate
packages for the Sirius I. So much
so, according to UK distributor
ACT Microsoft, that it has placed
a special order for extra machine MAJOR threat is hanging over A MAJOR threat is hanging over the latergovernmental Bureau for informatics and its \$1 billion plan for computers for the Third World. One of the IBI's most im-portant member states, Brazil, is thinking of pulling out because it is getting too little return for its

ACT has also set up a divisina co-ordinate and market program for the Sirius and the companie IBM Personal Computer, both of which use the Intel 8088 micropo hazi has been contributing ultrational body and getting aly \$10,000 worth of benefit.

"We are virtually under a To assuage the Brazilians, the says Barry Jacques, AC ill is trying to put together a plan Microsoft's managing directs, claiming that by the end of the year the Sirius I will have a war range of software than any other aboratory in that country. If this omes about by the end of the year bere could be a change of heart in

nicrocomputer in this country.

The machines so far delivered The laboratory would be set up in the capital, Brazilia, and would - "hundreds" according to ACT's Chris Buckham mainly gone to softwere velopers, but they are staring a go out to end users in volume, we shrink-wrapped software he form of the standard Words, MicroModeller and SuperCal.

packages.
As well as releasing Siriu wo sons of these packages, ACT indi-is transferring others, include minicomputer-based comments

division. On the operating spatial front, the IBM Personal Congulator's MS-DOS from Microsol ahould be available from tell development is under software-controlled add-on book to emulate various commi

protocols from Millhouse Design of Alton, Hampshire, and a President From Bolton-based B as B Computers. When the machin launched in this country is a wember, designer Chuck Peddiwho also developed the Country dore Pet — said that the manual country with the country with the manual country with the country in the country between Sirius and ACT

software strength, was need He saw the marketing pending on professional phi

by Donald Kennett

YEROX'S campaign to establish municating office products and the municating office products and the scheme has since generated considurance its much-publicised Ethernet local

panies that have asked for licences

work transceivers; nine, interface frontrollers; four, controllers; four, controllers; and 10, tompatible attachments. Twenty of the 270 are in Large and 75 in

of the 270 are in Japan and 75 in

Europe. Installations have been made at

35 sites in the US since last sum-

mer and another 60 are in process. In the UK, the first installation is

The five differences are the pin

to use the Ethernet design, 22 are developing products: five, network transceivers; nine, interface

includes allows addresses from eight bits to 56 bits in multiples of eight bits, while Ethernet has a fixed 48-bit address. The IEEE

One problem that arises from the differences that remain between the specification between the specification between the specification and published by April, Liddle said.

plans to start introducing interface allow systems from different

requires a disable wire to tell the transceiver to switch itself off, while Ethernet relies on the power line on its own. The IEEE requires

packet starts, while Ethernet

lates to the bottom two layers of the International Standards Orga-nisation's seven-layer model for

So the companies are talking to the European Computer Manufac-turers' Association about levels

Draft of the IEEE 802 standard

specifies a single start bit

network specification as a world erable interest. Out of 270 com-

Brazil threatens to pull

out of Third World aid

standard for high speed local net-

works being drawn up by the Insti-

Engineers in the US.
According to Xerox office products division vice-president David Liddle, one of the original

Ethernet design team, only five technical details of the IRBE's draft proposal are still different from the Ethernet specification.

"In recent months we've come

from being quite different to being

very similar," said Liddle.
The IEEE is a US body but its

standards are followed widely in the rest of the world. It previously

gramme, Bernasconi describes himself as "quite confident" of success. He has already collected a number of projects for it from both developing and developed ountries.
His relations with UNESCO

strained last year when the UN agency accused the IBI of encroaching on its territory, are improving, he says. Conflict is being tion starting this month, and UNESCO director Amadou-Mahtar M'Bow is due to visit Rome in April to approve the joint plant that will have been worked out.

Teletrial trial Cellular radio

COMMUNICATION services

vised to increase the number of done by dividing up an area into cells into which transmissions with limited range are made. The cheme has been adopted by the Mercury alternative telecom cations network in the UK as a fast way of setting up links to custom-

The FCC has confirmed the arrangements it proposed last April for licensing cellular radio ser-vices, Under them, frequencies would be allocated to two compet ng services in each area, one of hem provided by a telephone

The new company is called Cel-fular Communications and its president is William Ginsburg, former FCC deputy chief for policy. Charles Ferris, former FCC chairman, and Thomas Ca-

French govt orders home-made micros for secondary schools by Jack Gee

THE first part of a large order to put microcomputers in French secondary schools has gone to two home manufacturers, Logabax and

The Education Ministry has placed an order for 2,200 microcomputers as the first step towards a final total of 4,400.

The order marks the intention of the government to revive a school equipment programme which it suspended after taking office last summer. Education Minister Alain

LIDDLE . . . "From quite different to very similar."

Three and Four, the Network and

the support of several member

companies for their proposals. Be-yond that, Xerox plans "a whole

raft of higher level standards" fo

things like packetised voice mes-

sages, graphics and special applica

DEC and Intel also plan to pub-

lish higher level proposals, expect-ing all three to differ because of the

tions as the need arises.

Transport layers, and they claim

Savary now seems likely to carry out "Operation 10,000 Micros" launched by his predecessor, Christian Beullac, during the presidency of Valery Giscard

d'Estaing.
About 300 high schools have been equipped with microcomputers since 1979, with an average of eight units for each school. A further 200 schools would normalise the schools with the school of the school mally have received micros this different markets and types of ap-plication they serve, but they will

The number of schools involved is now likely to be only 100. But the leyel of orders from computer manufacturers will reach the same

level as under the last government.
The objective of "Operation 10,000 Micros", which appears to have been adopted by the governine printers as aids for teaching languages, history, geography as mathematics.

Daniel Gras, a Ministry of Edutraining centres, each equipped with a score of computers, will also

be opened this year to train 200 teachers by Christmas.
Gras added: "The plan is to have a teacher qualified to initiate high school students in each school."

With 6.000 microcomputers scheduled for installation in French schools by the end of 1982, all the major manufacturers have

been competing for orders.
Logabax, which has supplied 1,000 units since 1979, now gets an order for between 1,100 and 2,200 micros for this year. The same quantity has been ordered from eanord, a small firm with a staff of 100 near Lille.

Leanord specialises in designing electronic equipment for laboratories and industry.

Twenty dismissed – and another 20 resign at CACI consultancy

to the shared mass storage. STAPP are beginning to leave cations consultancy DMW.

Separate networks can be linked if troubled consultancy CACI of Carter was until recently Internet, of Dorking, is taking on UK distribution rights of an Ethernet-like network of workstations, the American Scientific since including and standard commercial applications. tions, including conversions of Internet's currently available pack-ages for its Jacquard systems.

access to mass storage, though a more practical limit would be around 100, according to linternet director Ken Groome. The file server can run 62 Mbytes of Wineless syndicates, says Groome.

The SDS 400 system will be launched in May, when installaoe operational nationwide. In-Each workstation, based on a 6502A microprocessor with 64K of ternet is seeking distributors for the north of England, Scotland and Ireland and will cover the south of England itself. memory, can also support up to 62 Mbytes of local hard disc storage. The practical limit on the number

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their own accord following the sackings which have taken place under the terms of a non-competisackings which have taken place aince last May. And at least one extended the first time of his leaving settlement with stage of a hearing by an Industrial Tribunal on his complaint of un-

fair dismissal.

Over 20 people have been dismissed as part of the 40 who have left since last May. The latest to go is Terry Wilcox who has resigned from his post as department manager for advanced technology. "Being with CACI was unsettling," he said. He could not cope with the loss

of two bosses in six months, he

Wilcox formerly worked at, CACI for Tony Carter, previously chief executive for European operations who was replaced last May. He is now to join Carter's

ater sacked is resisting the terms Carter was until recently barred of the leaving settlement he has been offered. Ian Palmer, former senior European vice-president,



CARTER . . . Hired his former staff from CACI

Training

for civil

Steorts nor any other company spokesman in London has been available for comment.

servants

by Philip Hunter
THE Civil Service is introducing
new training courses in the hope of
enlightening in members about in-

Top administrators and managers are being sent on a three-day course at the London Business School, while less senior people will attend seminars lasting between two and five days organised by ICL, IBM and the Royal Mili-lary College of Science.

Follow-up courses will be provided by the Oxford Centre for Managers and managers.

fanagement Studies.

Middle Civil Service grades will a programme of 40 one-day seminars, whose material will be embodied in a course reference

A package of commercial course to project control and systems design has been brought in and will be adapted to the needs of government projects under the guidance of CCTA.

Satellite links to oil rigs

by Donald Kennett \
COMPANIES needing to exchange data with oil rigs or ships at sea should find services improved following the introduction of a new maritime communications satellite

over the Atlantic.

The satellite, Marces A, was inaugurated last week by the International Markime Satellite Organisation Immarsat, after it had been manoguvring into position and undergoing tests since its launch by the European Ariane rocket in December:

Middle Civil Service grades will have their awareness awakened by a programme of 40 one-day seminars, whose material will be embodied in a course reference.

These are expected to reach 4,000 civil servinate by the end of 1982. Other one-day courses for senior staff on topics like "the impact of microcomputers" will be provided by the Civil Service College inself.

There are also changes in course for olvil servants directly involved in data processing.

A pack age of commercial course for project control and systems design has been broughs in and will serve and self-time.

transmitters and receivers.

Hut the mark generation of system for maritime satellines now under development is expected to support even simpler and cheaper suite borne terminals.

success with young families

ELETEL, the French videotex cherment now under way in a Parls suburban district, has

operated with 96% efficiency during its first six months in service.
Pierre Destrade, regional direction of the service of the tailare rate of only 4%. This is servencouraging.

The Teletel experiment has avolved the installation of terminals in 2000.

mals in 2,200 homes around Ver-nilles. Residents, are making an average of two calls weekly from each terminal, with a duration on frenge of 15 minutes per call, outing which they consult three or our of the 150 information ser-lies, available.

liketel is much more popul diden then with the elderly.

Mode class residents make conbly more calls than working

lettel promotion chief Domi-land Lamiche said: "We were strid that after a few months the noticly of Teletel would give way to lick of interest. But traffic has med steady and interest is as

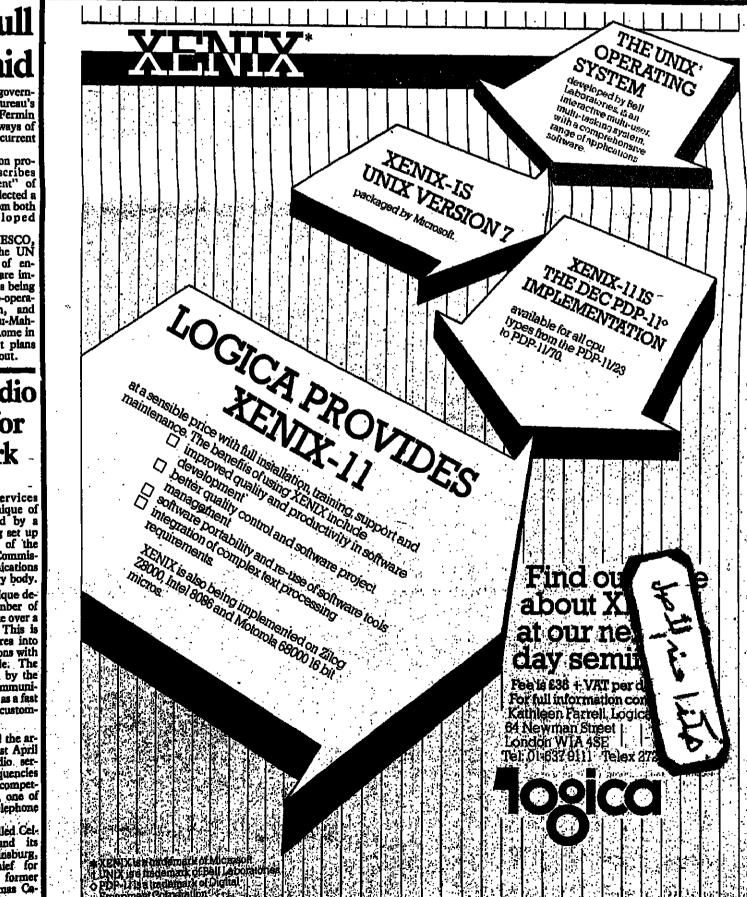
the most sought effer service is I

services for **New York**

y Donald Kennett

based on the novel technique of cellular radio are planned by a New York company being set up by three former officers of the sion, the US telecommunications and broadcasting regulatory body. Cellular radio is a technique de-

sey, former deputy chief for opera-tions, are among the principals.



Centronics has high hopes for colour printer

close to completion at Centronies, the world's second largest printer talked about Quiet Writer at the

An announcement is expected aimed at restoring profitability to the financially sick giant.

The colour printer will be based on a new impact method of putting marks on paper. "Colours can't be printed with dot matrix printers," explained Terence Harris, viceresident of European operations.

"You can't get the dots close enough, and if you have them closer, you get into problems with bending of the impact wires and unreliability."

Centronics recently revealed its long-term view of the printer market and believes that colour will play a vital role in the office systems and small business area, in

by Philip Hunter
AN advanced colour printer is velopment of quiet printers.

To avonate to approunce the

end of the year for the small busi-An announcement is expected ness market. This uses a stylus attached to a flexible frame, which can be programmed to enable, in principle, the printing of any style of character. Centronics has al-ready introduced the first of a range of quiet printers and an-nounced the 350 series, a new range of dot matrix printers, which replaced the obsolete 700 series

The company blames last year's losses on manufacturing mismanagement, inventory write-offs, and high interest charges on previous debts. These problems have been allayed by a recent deal



return for 35.5% of Centronics

Control Data claims that it approved the deal to give itself access to a wide spectrum of printers.
"Centronics is strong in medium
and slow printers, while CPI pro-

duces fast printers," says a Control Data spokesman

In 1980, the number of screens delivered for use in clustered ter-However, CDC has not made a minal systems was 43,000 units. success of selling its printers, and is reckoned to be relieved to sur-render the marketing of them to With an average value of \$10,000, this represents a total revenue of \$430 million. IDC predicts that, by 1986, there will be an increase to 200,000 units, giving \$2,000

to add small processors to the configurations rather than repairing their mainframes, and a significant 60% remained with the sme hardware supplier.

Terminal Markets in the Deinbest
Data Processing Raylroamest - Wester
Busope, IDC Ruropa Lid, 2 Beh Red,
London W4 1LN, £1,250. At present the market is shared between a variety of European and US manufacturers, but IDC sees

for distributed data processing (DDP) will rise 560% from \$500 million in 1980 to \$2.8 billion in 1986, when almost 20% of small

national Data Corporation.

IDC says that 42% of the revenue from the DDP market

now comes from clustered termi-

nal systems, and that by 1986 they will account for 50%. Minicomputers will continue to decrease in

mportance.
DDP environments will provide

the largest market for clustered terminals, rising from 49% in 1980 to 70% in four years' time.

Japanese memory leapfrog

by Kevin Cahill IN an expensive game of leapfrog, Japanese microelectronics manu-facturer Toshiba has abandoned

by Andrew Thomas
THE Western European market
for distributed data processing
for DP) will rise 560% from \$500

the IBM 8100 having a significant effect, gaining up to 60% on the rage, with 70% of the significant rage, with 70% of the significan 1986, when almost 20% of small processors will be used for distributed intelligence, compared with under 10% at the beginning of the decade, says a report* from Interthe race to produce the next generation of dynamic memory chips Instead, the company is

planning to invest 20 billion yen in a plant which is designed to deliver one-megabyte chips in volume by the end of 1984.

An experimental one-Mbyte RAM is expected to be available sometime in 1983.

The common explanation for the direction now being taken by one of Japan's leading semiconductor manufacturers is that it is conserving resources. Toshiba seems to be hoping that its princi-pal Japanese competitors will be concentrating on 256K chips, while Toshiba itself is busy cor-pering the next advance in the

memory market.

There is a precedent for this.
During the VLSI project, on which Japanese computer companies spent around £120 million, Oki Electronics was ignored because it is ministrate presence in cause of its miniscule presence in

way, Oki set up its own chip manufacturing plant, but effectively bypassed the existing industry standard 4K and 16K and began operations by mass producing the next generation of chips, with 64K

capacity.
Although most of Oki's (dRAM) production is still used internally, the decision to concentrate on the next generation of chips ahead of ensing producers pushed the company from nowhere to about

And the company used this base to develop a 256K dRAM of its

Oki began delivery of sample 256K dRAMs last September and certainly looks set to be among the

With rivals NEC and Hitachi moving production of 64K



Telecomputing romps through the £2m barrier –despite the lawsuits

The company has re-established

a working relationship with ICL,

and recently bought a ME29 via the credit established as part of the

TELECOMPUTING Holdings
has put its large water 100 and 100 systems Ltd has been transformed has put its legal wars with ICL and ECS Microsystems behind it and turned in sales of £2.03 million, up £430,000, in the year ended Sep-

Last year Telecomputing was awarded over £750,000 from ICL £400,000 in cash and £350,000 in credits - after ICL breached its agreement to supply Telecomputing's TP monitor software. Micro supplier ECS had its claim of £400,000 against Telecomputing withdrawn on appeal. Neither of

The second victory soured the commercial relationships between the two companies according to Telecomputing chairman Bernard Panton, and Telecomputing is no longer selling ECS equipment.

Profits were trimmed to a slim £20,138 last year after Telecomputing Systems Ltd, a subsidiary company, had been written off last August at a cost of £244,000.

AIR CONDITIONING

launch new versions of the TP mo-nitor TPS, and both Panton and Telecomputing's technical director Telecomputing Holdings and John Garrick expect to win some of the former engineers and staff. It now trades as Telecomputsubstantial orders. TPS is already ing Microsystems Ltd.

running in two sites.

Garrick says that there is severe criticism of the ICL TP offering A decision on a replacement supplier for ECS has not yet been TPMS on the VME operating system, and on the TME/TP softtaken by Telecomputing not to mention when they are re-The first quarter of the current quired to work in a network such as IPA.

financial year has restored the company to a healthy profit of £64,482 on turnover of £392,000. "The new TPS, on the other hand, provides uniform user in-terface, and the old 1900 image is Panton is predicting that it will once again break the £2 million barrier in 1982, with profits on target at £250,000. gone," he said.

Novel service

BOC Datasolve is to offer an IBM legal settlement.

One of the ICL bureaux in South Africa has also bought two of Telecomputing's TP monitors.

In a novel approach the company is offering a service which simulates a 4300 in the user's office. Prices start at around This year the company will £6,000 a month.

Protocol conversions

by Boris Sedacca THE Tower of Babel created by manufacturers of office equipment adopting different interfacing protocol conversion, but lack the methods has created a market for devices to translate the signals between pieces of equipment. A new company, Jaguar Communications has been established for the prim-

Its managing director, Martin Its managing director, Martin
Hewitt, says there will continue to
be an enormous demand for protocol conversion devices until all
manufacturers of computers and
terminal equipment conform to a

single communications protocol.

"Many UK companies have tremendous expertise in the field of

resources to market their end product effectively," he said.

"They produce devices on a project basis for a single customer but are not always aware of their potential because these devices are tential because these devices are

often based on sophisticated

SDP view on subsidies

SOCIAL Democrat MP Shirley Williams has come out for the controversial proposal that the government's employment subsidies (rather than investment subsidies) should be scaled according to

This is so that there would be a bigger subsidy for highly skilled jobs in order to attract the technologically sophisticated, skill-intensive firms which the country which the country

She believes that such a selective

But that would not be enough. ing training for new skills, adequate venture finance for small high technology companies, faster response to planning permission applications and a programme of government regulation and public purchasing to encourage innovation.

policy would encourage the technologies to flourish.

They would have to be supported by a wider range of policies includ-

Mrs Williams has also called for

Raytheon plans fast ICs site

560% rise in distributed

market by 1986 – IDC

data processing

IDC describes the 8100

"slow starter," which is begin

be as high as 17,000.

The UK, France and West Grand was account for almost two thirds of the European DDP maket, with West Germany slightly ahead. This is unlikely to change by 1986, despite the IBM poemtion of smaller countries.

ion of smaller countries.

The report cites user enthusis

as a common problem, with fire-time users expecting too much of their new systems, but the pro-sion of hardware and software

support at remote sites also cress difficulties.

Most users moving to DDP ted

DEVELOPMENT and production of very high-speed integrated circuits is planned for a new microcircuit factory to be built by

The site is next to the company's manufacturing plant in Andover, Massachusetts, and will supple-

used as signal and data processors, logic units and computing mod-

mid-1984, when it is expected that

he fourth place in the league of

own in parallel with the companies which took out patents from the 256K VLSI project.

top three or four producers in Ja-pan, if not the world, when the 256K is the industry standard.

NEWS BRIEF

Home swaps

computer-based National Informa computer-based National Informa-tion Scheme to help council tenants who want to swap their homes, John Stanley, Minister for Housing, announced to the Com-mons. The Tenants Exchange Scheme will come into operation at the beginning of April. A compu-ter bureau is being chosen from six bids to establish the scheme for local authority, new town and housing association tenants who wish to move by exchanging

Euro offshoot

NETWORK Systems Corp is to establish a subsidiary, Network Systems Europe, to take over European distribution of its HydRAMs to one million a month and Hitachi determined to mass produce 256K dRAMs late this year, Toshiba have obviously decided on a variation of the Oki strategy and gone for the next generation.

Buropean distribution of last Pyperchannel high speed local network from Slough-based Tesdata. Staff currently working with Hyperchannel at Tesdata will transfer to the new company, which will be headed by Tesdata's general manager David Addison.

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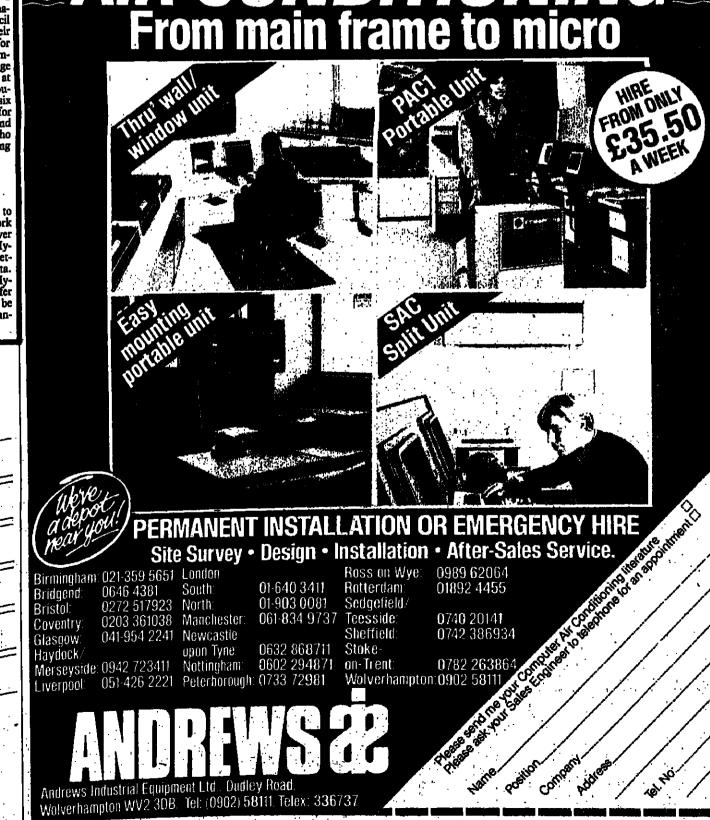
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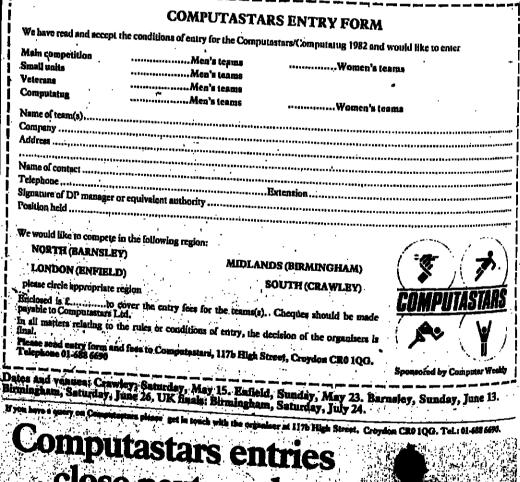






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IBM 4300 needs support - Altergo aims to give it

hat its popular 4300 series mainrames would cut out an expensive middleman, the systems pro-grammer, has not materialised. Systems house Altergo plans to

To achieve its aims, IBM an-ounced its System Installation f software which provided sers with a ready-made operating ystem environment for configur-

s programming function is for 4300s, although most 4300 installations are too small to need the services of a full-time

Altergo sees a market gap here.
"I think IBM oversold SIPO when
it first launched the 4300 series,"
said Dick Jones, Altergo's manag-

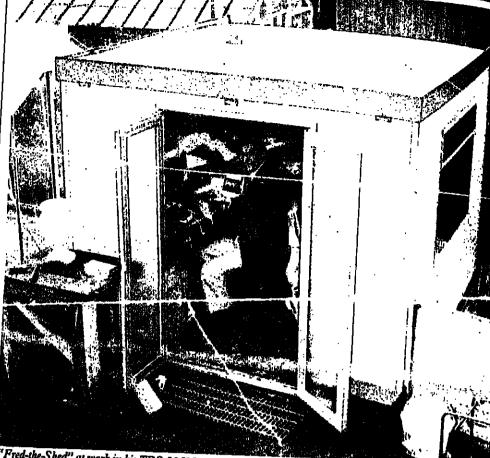
periods, if for example the user wants to carry out a major en-hancement. They do basically all

Jones says that a typical IBM 4331 user will contract for about one day a week, although the company will allow for a minimum "It depends on the type of work the user is running. If he is using

IBM 4300 mainframe installation supporting VM/CMS, DOS/VSE or OS/VS1. A range of options, including commence and approximately commence and the commence of th including software consultancy, installation and maintenance,

It also covers system tuning to reduce I/O contention and enhance system performance, and system ailoring to ensure that the required facilities are available with

These services are less likely to be necessary on IBM's new 4321 because IBM appears to have got its act together better here. The 4321 operating system, Small System Executive (SSX), is a cut-down version of DOS/VSE with restricted facilities, so it goes much



"Fred-the-Shed" at work in his TRS-80 HQ.

Bulletin boards could edge out Prestel

by Maggie McLening

PRIVATE viewdata services are growing rapidly in popularity and could corner the market for local or specialist information, leaving Prestel out on an expensive limb.

When Prestel first started,
British Telecom promised to cut

British Telecom promised to cut telephone charges for Prestel, which might have alleviated the

tors has been a markedly tepid re-action to the service from the public, and a spate of home-grown viewdata software from a few en-terprising companies and indi-

One such individual is Fred Brown, the UK pioneer of the bul-letin board system for microcom-puter users, which offers advertis-

Operating from the unlikely acadquarters of a garden shed in Hull, in which is housed Brown's Hull, in which is housed Brown's Hull, in which is housed Brown's TRS-80, this service has users from Holland, Cyprus, France, Denmark, Sweden,

Known locally as "Fred-the-shed" from the days when he used roofing contractor by trade and also owns a shop called 3-Line Computing from which he sells

"The bulletin board is really my hobby," he explained, "I opened the shop to help pay for it."

of his interests, and he claims to have been only the third person in Hull to get a TRS-80 by 1979. It was originally bought to help with accounts for the roofing business, but a holiday in California gave. Brown the idea for the bulletin board.

He brought back a copy of Forum-80, the networking program at home."

widely used in the US, and adapted it for his TRS-80. From this, he then developed his own Mailbox-80 software, which is now in use at 'fandy's head office at Walsall and throughout its distribution had a software the software

Commodore and Apple, havebeen round to glean ideas for their own

systems, and Commodore has recently launched the Compet service for Pet users. This, however, is not free of charge, as Brown's i.

"My system was England's fint public electronic mail system. It's been running 18 months now," commented Brown. He is full of ideas above the street to which it.

Mailbox-80 differs from Forum BO in execution because it is one

with 48K RAM and 2 disc drives.
Purther equipment costs are
minimal, being the price of a modem and terminal for each user.

"Looking at what's happening in the States, I think this should restly the states of the state of the states of th catch on here far more than Prested once the small businessman be-comes aware of it," he said. "I know the equipment is cheaper in the US, but it's now getting cheaper here too, and there'll soon be far more people with computers as here."

Micro project management

PROJECT management, an application which has for many years been the exclusive reserve of the service sureaux, is increasingly finding its way onto micros.

Thorncroft Manor Services, a cetherhead-based bureau and software house, has now isunched a micro-based project management package called T Pert to run on

the CP/M operating system for

Micros are slow but users trade off this inconvenience against that of waiting for work to be returned from the bureau or of hooking up. to a time sharing service.

T-Pert allows a user to analyse and monitor up to 750 activities. It is written in Fortran and need

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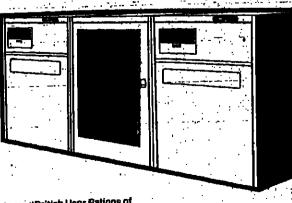
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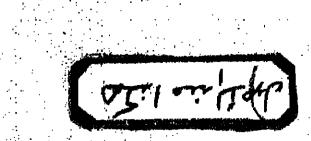
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CTL TAKES FIRST PLACE IN SURVEY in the 1981 Datapro "British User flatings of Computer Systems" survey, CTL ranks FIRST in its

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\$6m confidence in micro venture

AN intriguing story of American venture capital financing lies be-hind Keen Computers latest addi-

The new machine, presented to the European market last week, is the Plexus P/40, an advanced 16-bit mini micro designed around the Unix operating system.

butor and Ron Weedon, Keen's chairman, says the P/40 will complement the company's existing Onyx product rather than compete

The P/40 is substantially bigger and consequently more expensive than the Onyx. The man who links Keen and Onyx and the two micros is Bob Marsh, president of Plexus, which manufactures the P/40 and former president of P/40, and former president of Onyx until he left to form Plexus

Marsh is also president of the Unix User Group in the US.

The extent of his faith in the Unix system, which he describes as an industry standard, can be sured by the fact that he managed the crention of the Plexus P/40 around the operating system, and also persuaded investors to put up \$6.1 million in venture capital to help him get the machine out of

Apart from Marsh's \$100,000, and \$300,000 put up by other

Cross hair cursor

Plexus employees, two UK invest-ment institutions, Abingworth (London) and Ivory and Sime in Edinburgh also took shares in

Independently of the search Keen was making for a mini to complement the Onyx machine, Abingworth also decided to invest

According to Marsh, who did his start-up financing in two rounds, which raised respectively \$1.5 million and \$4.6 million, Plexus should be ready to go pub-lic in two to four years' time. By 1986 he expects the company to be making sales of about \$100 million, which looks like quite a temptation to investors given the opportunity to get in on the

Robert Parry writes: The Plexus P/40 is one of the few machines so far designed specifically around the Unix operating system. The hardware is optimised to bypass Unix bottlenecks with microprocessor-based controllers looking after terminal and disc I/O.

Parts of the operating system are moved down into the Z8000s in these controllers, off-loading the central job processor — which also uses a standard Z8000 — and increasing throughout Beat creasing throughput. Each terminal controller can handle up to

Debts rising as real growth still eludes IBM

tion of virtual zero growth.

The accounts, which are adjusted for the effects of inflation over three years, show that sales

This slide has prevented IBM revenues in real terms rose by only \$323 million or 1.1% of gross turnover between 1979 and 1981.

to calculate the effect of inflation, the figures over three years are restated to account for specific

price rises affecting the company.

The adjusted sales figures for 1979 were \$28.64 billion, \$28.92 billion for 1980 and \$29.07 billion

This is a real increase of \$400 million over three years represent-ing less than 0.46% per annum. Profits, apart from a slight rise

in 1980 are down in real terms from \$3.47 billion in 1979 to \$3.24 billion for 1981. The 1980 profit actually showed a slight rise over 1979 to \$3.52 billion.

The key point here is not just that IBM has suffered from inflation like everyone else, but has done so in an industry where real growth, after inflation has been taken into account, is commonly estimated at about 12% to 15%

One of the most savage effects of inflation, however, does not appear in a company's sales figures, however adjusted, but in its liquidity position.

If inflation is really impacting a

company, eroding both its profit margins and its capital base, the cash it can generate to meet new investment demands will fall and debt, inevitably, will rise.

IBM has been caught in a deadly pincer movement in this respect.

Takeover

LOSS-MAKING German compu-ter company Kienzle Apparate has now been wholly taken over by the

engineering group Mannesmann

THE IBM annual accounts de-livered last week show that the company is still trapped in a posi-in turn have led to a slide in its

going to the stock market to raise new capital from investors.

This in turn has driven IBM to sources to provide the y buffer between the rising cost of capital and the failure of

In 1980 IBM arranged a series of lines of credit, effectively loan commitments, with a series of American and international banks.

to \$3.2 billion (not \$5 billion as stated last week) and by the end of 1981 IBM had taken up \$570 million of the loans, mostly in the US.

This increased IBM's long term debt by about 20%, to \$2.66 billion from \$2.09 billion in 1980.

Interest charges paid by IBM on the loans rose from \$273 million in 1980, to \$407 million in 1981.

Although the company ended the year with the actual cash position up to \$454 million from \$281 million in 1980, interest receivable fell from \$430 million in 1980, to Over the five years beginning

1977, IBM has shown a net deterioration in its liquidity of nearly In 1977 IBM had cash and marketable securities worth over \$5 billion and debts that year of under

The current position shows debts of \$2.6 billion and cash and marketable investments of \$2 bil-

Despite this IBM has invested

Riding high

DESPITE a £2.9 million fall

by Kevin Cahill **Floating** Point sales buoyant

supplies high value floating point array processors for special applications in the scientific and technical fields, supplied the bulk of in recent sales into two key marken.

X-ray comportantly and selection.

X-ray tomography and scismic ap

pany's sales by market type show

that X-ray applications accounted

for 36% of sales, seismic 26% and

the remainder was distributed among signal processing (14%), simulation (6%), image processing (2%) and service and repair appli-

The X-ray applications involve the resolution of body images into

Seismic applications include oil

well modelling and oil field

structure analysis.
Floating Point has an OEM deal with IBM and Digital Equipment, which decided to buy the com-

pany's products rather than com-pete in this highly specialised field.

Susan Hirsch, a compute in-dustry analyst at New York bro-kers Smith, Barney, Harris,

Upham and Co, says she expects Floating Point to increase the me-

mentum of deliveries of the com-

pany's FPS 164 from last quarter's 10 machines to 35 for the re-

cherent pictures.

president and chief executive of IBM. After two years in

in research and development over

And the company has held its selling, development and general costs to roughly similar levels over the past three years. The non-in-flation adjusted figures show those general expenses rising at about 10% from \$9.2bn in 1979 to \$10.3bn in 1980, to \$11.02bn in

opment is not shown anywhere in the accounts and analysts have expressed some concern that the company may not be increasing R&D at a time when most of its competitors are ploughing more money in real terms into new pro-

The sharp edge of this criticism is directed at IBM's mainframe 3081 series which is still watercooled when most of the competition is able to provide air-cooled machines of equivalent power. Over the past three years IBM

has maintained an almost unchanged gross payment of divi-dends to its shareholders of \$2,008 million in 1979, \$2,008 million in 1980 and \$2,023 million in 1981.

CW SHARES TABLE

unknown OREGON-based specialis co-puter manufacturer Floating Per Systems has pushed up siles for the quarter ended January 31, by 47% and profits are up 93% on pared with the same pariety AN audio cassette has been produced for all those who need a microcomputer but don't have time to choose the right machine pared with the same period b minutes — the average journey time into work, according to spon-

Sales revenues were \$19.1 ml. lion, a \$6.1 million increase on the same quarter of 1981, and a \$2.4 The tape, presented by broad-caster Brian Redhead, gives a background to the technology and the terminology, with advice from million improvement on the con-pany's first quarter ended Octo-Profits for the quarter were \$2.5 million, compared with \$1.3 million for the same quarter a year government, industry, distributors and manufacturers.

David Fairbairn of the NCC, Maurice Gaffney from the Dol, Bric Bird of the NCC's Microsystems Centres and repre-sentatives of Apple, Hewlett-Pack-ard and distributor Rank Xerox can be heard on the tape.

The cassette is available from

Xerox Stores or direct from Xerox

Perhaps I am lucky that my journey doesn't last that long, but while I was on the train the voice of Redhead in one ear alternating with an expert, or a crash course in recognising types of printer by the ertainly beat reading the paper. For one journey, anyway.

IT seems a bit much to bear when

the very materials from which

data the chips contain. But the

research laboratory of the Americ Bnergy Authority, Har-

problem.
Since 1978, when "soft" errors caused by alpha particles from radioactive impurities in the materials of the VLSI circuits were

ufacturers have been looking

Data Efficiency Ltd

for ways of detecting the tiny smounts of impurities that can

play havoc with circuit perform-

Journey Motorola boosts place in into the advanced micro market

with 68000 range chips

up with announcements of new processor and peripheral chips to Motorola and US second sources

Aostek and Signetics joined forces emphasise the view that a single ompany can no longer go it alone. By spreading design effort

to ensure a good share of the mar-ket for the 68000 family. Motorola estimates the market for 16/32-bit processors, and, particularly peripheral chips, to reach \$1,500 million by 1987.

year between Motorola and what are now termed its co-suppliers, provide for complete technology exchange on 68000 family devices over five years.

factured by at least two companies, assuring users of a stable source of grade path when future devices

to detecting 'soft' errors in VLSI

radioactive impurities has been de-

veloped at Harwell. Fission track

nium in concentrations as small as

two parts per billion.

Harwell says this will give

manufacturers a level of quality control sufficient to assess whether

Specimens of semiconductor

material are coated with a poly-imide film which records tracks of

fission particles emitted when the specimens are bombarded with neutrons in Harwell's materials

first diagnosed, memory chip their raw materials meet the

toradiography can detect ura-

Motorola's design stable spread 8086 family contains a processor the 68000 down into the 8-bit with an 8-bit external bus, the world and up to 32 bits. The 68008 operates on an 8-bit bits, allowing the use of cheaper established 8-bit peripheral chips and byte-wide memories, while maintaining soft-

It is scheduled to appear this year, as is the 68010, an upgrade of current 16-bit 68000.

The 68010 will support virtual memory and virtual machine concepts by means of a virtual memory bus. It is the Redwood development Motorola talked about last year, and by exchanging the processor chips in 68000

The 32-bit version, 68020, have the features of the 68010, but a 32-bit external bus rather than the 16-bit. When it appears by the end of 1983 it will more than double performance, Motorola

With these moves in its processor range, Motorola has gone in much the same direction as its cur-

mined under a microscope. From

Another approach to reducing soft errors has been adopted by Hitachi for its 64K dynamic

the PIQ chip coating used with

cell storage capacities and higher

ected directly, the information gained, it is then
Now a method of detecting possible to work back to the

Like the Motorola announce-Harwell comes up with solution

Motorola itself has designed a floating point co-processor, 68881, to interface closely with the 68020, and a bus arbitration module and Semiconductor manufacturers chemically etched to develop the now specify alpha particle emis- tracks, which can then be exa-

> effort with its Dutch parent Philips, is five devices including a dual universal asynchronous re-

conventional ceramic packages for 64K RAMs to reduce alpha parti-cle susceptibility to soft errors, Hitachi has brought in design changes to allow plastic packaged devices — the first, Hitachi

Its 32-bit offering, the iAPX 432, is not compatible with the 8086 family, but there is persistent talk of a 32-bit iAPX 386 which

offering, compatible families announced virtual memory support with the Z8003 and Z8004 processors in its Z8000 family, and is developing a 32-bit device called the Z80000.

the Z80000.

National Semiconductor is close to making its NS16000 family generally accessible. Major customers have had samples of the 16032 for over three months and various CPUs and peripherals are expected to come out this year and next.

tents, these will involve versions of the 16-bit processor with eight-, 16- and 32-bit external buses and

ceiver/transmitter, now going through initial wafer runs and due for sampling by May this year. It will also be sampling the 68000 in

From Mostek comes a single-

were a serial I/O controller,



COMPUTER WEEKLY, March 11, 1982

lby Robert Parry

CAD systems for gate array circuits flourish COMPUTER-sided design 4,800-gate model the first

ystems for gate array circuits are Hot on the heels of systems like

Ferranti's ULA Designer and LSI Logic's LDS 1, which recently became available to users for de-signing and testing their own devices, comes an advanced CAD system for a new series of CMOS arrays from Motor 'a, to be integrated with its a 'CA bipoler array CAD system.

Plessey has started up a bureau

premises. Based on a VAX computer from DEC, the service can be used for Plessey's CMOS or Microcell gate arrays.

Meanwhile, Giltspur

Maxey, is getting many enquiries

turnover, from £103.6 million in 1980 to £100.7 million in 1981, NCR Group in the UK pushed profits over the £12 million mark. This compares with £11.47 million in 1980. The group of the profits of the first own the £12 million in 1980. The group of the first own the £12 million in 1980. The group of the first own the £12 million in 1980. The group of the first own the first ow of Kienzie for which the company paid about \$42 million in its own shares last year. The cost of completing the acquisition has been put at about \$20 million. emitted can produce an electric charge which may change the testing reactor, DIDO. These fissignal read-out levels. Hitachi says in 1980. The group, a wholly owned subsidiary of the NCR sion particles come from the Urathese give reliability two orders of eight terminals, giving a maximum of 32 users ilum-235 isotope. magnitude higher than conven-tional non-coated devices. Corp, says that orders for 1982 are nium-235 isotope. EDWINDS TERMINAL TERM From ribbons to custom-made **ADD GRAPHICS** WITH THE furniture LOW COST QUALITY you won't find a better company **DEC Terminals** ... from magnetic media to to meet your needs. Tybis shows the closing prices of The London Stock Exchange on Friday and in America is Thursday. The share index is based on the prices of the UK companies in the table. Highs and London been adjusted where necessary. * Shares traded on the Unitsted Securities Market or under Rule 163(2)(a). data cabinets, from stationery to **Distributor** Shredders and from daisy wheels Send for our full colour catalogue and price list today. to office furniture - DE is the computer supplies specialist £1250.00 Ex stock at the right is Index movement Data Efficiency Limited price...fitted with a plug and For over 17 years we've been Maxted Road, Maylands Avenue VT 100 GRAPHICS DISPLAY ready to go it makes sense to talk providing a service second to 106 100 096 090 Please rush me your latest catalogue Hemel Hempstead Now available with plain paper graphics print feature Full graphics capability High lessolution metrix Taknonix a shrwaie companie: Light pan option terminals with Rapid Recall. none - with stocks to match! Herts HP2 7LE For years Britain's No. 1 And with our 24 hour nationwide Telex: 825554 DATEFF G Microcomputer Specialists, now delivery service on stock items, the new force in Terminals. Cross hair curaor. ! • Rétains VT100 features • Green réster scan display . • Supports graphics packages Data Efficiency – for fast, efficient In stock now! Prices are single unit quantity Broker *Now with DEC field service service at the right price! apid Recall for DEC Terminals RIVA TERMINALS LTD New Head Office: Woking Business Park 9: Allest Drug Weking: Suriey OLIAL BLY 7: all woking 04827 7 001 (Telex: 95807 Northern Office: Tel: Harrogate (0423) 500887 For advice/service telephone 070 | 12 19 26: 2 9 16 23 30 7 14 21 28 4 (1 18 25 1 8 15 22 1 8 15 22 29 5 12 19 26 3 10 17 24 (1 18 25 1 8 15 22 (0442) 57137/8/9/0

Initial members of the high density CMOS array family will range from 1,200 to 6,000 gates, with a array," he says.

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Tragically

under-used

PROGRAMMERS Page (CW, February 25) makes a plea for a DO NOTHING statement. Algol

68 offers such a facility, the SKIP

SK1P (do nothing)

frequently, in loops: WHILE (serial-clause, that is, a

series of "statements" which even-tually ends up delivering a result which is TRUE or FALSE and

therefore determines repetition o

the loop body and of this seria

whereby we indicate once again that Algol 68 is a tragically under-used advance over its contempo-

rary and more recent competitors

in the field of procedural program-

ming languages.
MARK GREGORY

Headhunters

ALAN Williams (Salesbit on

Headhunters), thinks that search methods are fine for top executive

positions but not on for lower ones. What snobbery. That's a real world out there, not the playing

fields of Eton.

Mr Williams seems to feel that

there should be some kind of rule

book for recruitment agencies. I

have news for him, there is. Mos

of us conduct ourselves ethically

There is nothing wrong in pre-

senting a legitimate opportunity to a prospect who fits the profile of what the client company wants.

The prospect can always say no

Overseas Recruitm

London WC2

ROBERT DENENBERG

Senior managing consultant

and adhere to a strict code of

condition depending on

dependent action 2:

action not 2

IF condition 1

action 1;

THEN

action 1;

come of 1 and 2

THEN

Perils of paying too much to get more reliability than anyone cares about

The Ninth Law of Reliability: cal design decisions. For example: probable cost of errors, or until somebody insists on getting some useful work done.

THERE is a practical, economic limit to how much reliability we should build into a given system.

If we let young idealists loose on a programmed system, we can ex-

pect them to continue debugging the programs, trying to make the programs perfect. This could take infinite time since nobody knows how to do it.

Fortunately, even young idealists tire of debugging, and they will stop doing so before the program is perfect. But, if we let them stop based on when they tire, we might get far less reliability than our application requires. Not all idealists are equally energetic.

The management answer to these problems is to determine how much reliability you need and can pay for, and to specify the required reliability level in mearequired reliab: surable terms.

You might well ask how much reliability you can get for your money. The first issue is to determine a lowest acceptable level of reliability. This is the level below which the system user cannot and will not accept using the system.

A simple estimate would be the present "old" system level of relia-

bility, if the user is satisfied with it. Why should the user tolerate worse in a new system? Next, determine if any improve-ment is desired, and if so, how much. This forms the basis for the planned level of reliability in your new system.

The system designer then has to determine whether the planned level of reliability is technically feasible, and economically accepta-ble to the user. This may involve putting together a series of techni-

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equipment contact:

Tel: 07375 57496

atm Ltd. :

Investment in reliability will increase until it exceeds the paths in modules, build a deep database diagnosis program, and use distinct software plus a check-ing supervisor to detect and cor-

If the solution you propose seems technically adequate (it will probably meet your planned level provided the estimated costs are still acceptable to the user.

If you cannot find a feasible technical solution, or if the costs

In the eyes of the user it is the entire system that matters. So we must not fall into the trap of narrowly planning **program** reliability' and leaving the other items to chance

are unacceptable to the user, you must find a lower level of reliability which meets both these criteria, or you must search for more costeffective technical solutions than you have been evaluating up to

The technical designer should primarily feel responsible for giv-ing the system user-buyer a choice n the form of a curve of the reliability versus cost levels which can be bought. The user then can pick a point on the curve which satisfies his needs, and the developers can

Reliability, in general terms, is the probability of the system doing what the designers planned it should do. There are consequently

It is always necessary to make a tailored definition of the planned

reliability for a system. The usual criteria are related to correctness of output, accuracy of output, timelioutput, and availability of the system. These apply separately to all critical components of the ility) then you can build it

In the eyes of the user, it is the entire system that matters. So we must not fall into the trap of nar-rowly planning "program reliabil-ity" and leaving the other items to I wonder how many readers

ity for most systems.

have ever seen or used a plan for database reliability levels, for example using a deep database diagnosis program in random sampling mode (as Bell Labs does) and calculating reliability as auditors do. For example, if 1,000 records at random are sampled without any errors showing up, then with a certain level of confidence you can assert that the file is at least 99.5%

It is unacceptable in systems planning to see statements such as

10 YEARS AGO

branch accounting system, the Midland Bank has ordered two

Servicemen top the DP hit list to discover the major area of trial that the line printer could be a and tribulation in the computer industry, maintenance and service would surely come out on top. For once the opinions of computer once the opinion once the opinion of computer once the opinion once the opinion

Tom Gilb is an independent consul-

I have received from a major British corporation: . . "will require work to ensure the availability and accuracy of data . . . " This contains no hint (in the entire sixpage memo stating requirements for a major new production planning system) of the present levels of availability and accuracy, or of the future planned levels.

If these well-intended words are to have any effect in practice we must, from the start, define them in terms of measurable concepts. If we do not, there is every danger of the Ninth Law giving us less reliability than we really want, or of having to pay far too much to get more reliability than anybody

From Computer Weekly of March 9, 1972...

DRASTIC cuts in expenditure SITA high-level network for

to Burroughs for its online The order, valued at £1.3 million further B6700s, together worth about £1.5 million . . . British European Airways has become the first world airline to use the

DRASTIC cuts in expenditure including the dismissal of some headquarters staff, will follow the decision by members of the British Computer Society to vote for only a 20% increase in subscriptions, The BCS Council had asked for a 43% increase. Confirming its total commitment to Burroughs for its online covers the supply of over 1,000 terminal units comprising 450 VDUs and 572 character printers

once the opinions of computer management, DP teams and users would be united in pointing the would be united in pointing the in any case, the unified proach in the computer was finger at engineering services as being No 1 on the hit list. With hardware costs declining it

can be forecast, without the need for a poll, that computer equipment is becoming available to a much wider user base. As demand for computer power increases, so too does the related demand for the practical especial espec

But for once in the computer industry, the normal law of supply and demand does not fully apply. Demand tends to outstrip supply with companies such as servicing a range of installation to meet not only their equipment covering intelliging own demand, but those of the reruitment marketplace.

Many DP managers could be regretting that they did not take the engineering trail and study for the City and Guilds rather than the IDPM exam. Recent advertise-ments in the national and trade Press for experienced engineers suggest that only those with a taste for a Porsche, a mews cottage in Kensington and membership of the Embassy Club need apply.

Computer maintenance has become very big business. A recent survey claims that one leading supplier earns 15% of its profits from maintenance services. This could raise the comment that it is the non-provision of service which contributes to the profit base. Too often users become frustrated at the length of response time and the subsequent inability of the engineer to fix anything more involved than a fuse or tape drive window.

The time when the sales and service manager worked on the same side seems long past. No longer can the user rely on his equipment faults being relayed back to the sales manager, producing not only a prompt visit but a promise of lunch. Now each side seems determined to refute the

Micro crime

COMPUTER crimes are often

illed as the way forward for the

mbitious criminal. Stories of

multi-million dollar bonuses being

paid to programming staff involved with financial systems are not infrequent.

But the increasing use of.

microcomputers has led to another alarming trend: A garage in

Thinte, Oxon, was recently the victim of a midnight raid, when a £5,000 micro was liberated.

Try that with an ICL 2966.

Who knows?

proach in the computer room a becoming a relic of past generations and hardly surprisingly some users are turning to independent companies to handle all their sevicing and maintenance needs.

the practical aspect of space and

However, giving the mainfame service team the data elbow is not always a wise move. Few independent organisations are capable of gent front-end processors, back-end peripherals and dead-nd systems. With technology moving ahead by leaps and bounds, kep-ing in touch must be difficult for independent companies. For many users, loyalty and in-depth exper-ience count more than over exience count more than pure out benefits. Your local IBM engineer could well have experience of problems now being suffered by the installation and a ready re-

The main suppliers have got the service message. Response time guarantees are now being offered with the establishment of fault diagnostic centres. By means of a toll free connection, the user his the service of a round-the-clo problem centre which can often dentify the problem without the need for an on-site engineer. It most cases the user can replace the faulty unit or be assured that the engineer on his way has been tally briefed.

service turnover of \$5,000m for IBM alone, there would seem no excuse for manufacturers to offer a sub-standard service - even if the service alarm bells ring at 4.30pm on a Bank Holiday Friday.

Alan Simpson

DOWNTIME

Economics was just a game for politicians

STRANGE results from a telling new competition entitled Running the Economy, jointly sponsored by Digital Equipment and Kingston Polytechnic. The object was to pit schoolchildren against politicians to manipulate parameters like to manipulate parameters like money supply, government spend-ing, balance of trade and other saent factors to run the economy

lient factors to run the economy for nine years in a computer-simulated game whose results were displayed on a huge video screen.

Teams of councillors from the Tory, Labour and Social Democrat Parties took part just for the hell of it, but were not eligible to win the prize of a DEC VTISX

of the real economy. Beat of the council teams was Labour, which the winning school, with plus 7,000 points, was the Lycee Francais de Londres, an institution with 2,000 pupils run by the win the prize of a DEC VTISX

mixed UK/French marriages.

personal computer, worth £3,000.

The organisers need not have worried. The teams of councillors did not do very well - in some Cases very badly indeed. The
Tories came last, with a grand total
of minus 8,000 points of minus 8,000 points.

Bad luck I am sure and surely no reflection on the current running of the real economy. Beat of the

Programmers humbled

SINCE in inception the computer industry has been making attempts to give litelf "professional" status. While this would no doubt do wonders for the chances of DP managers skining membership of the more criciusive golf clubs. Must admit that the exect nature of the other benefits cludes me.

But whatever the reason for the epithet "professional" proving so attractive to DP unprofessionals, from the United States comes bad news. It would appear that motorcycle mechanics require more extensive training than do Cobol programmers.

programmers. An advertisement in an Ameri,

Can magazine neaded Careers Without College the international School of the Professionals" late the courses available as follows:

"Motorcycle Mechanics 15
Weeks FANTASTIC!"
Marine Mechanics 15 weeks
FUN IN THE SUN!"
"Compiler Programmers (Cobol)
- 10 weeks SHOOT FOR THE
STARS!"

I confess that there are no pro-grammers (Cobol) of my ac-quaintance who are shooting, other than payroll troubleshoot ing.

CRIME-PROOF, BUT SOMEBODY STOLE THE COMPUTER! Unsolicited

WITH reference to your item "Get Your Own Back" (Downtime, February 25) on senders of unsolcited mail I have often used the

Often one is asked to stick "Yes" stamp on a card on which is pasted a piece of computer printout bearing your own name and a code number. This is first steamed off and replaced by a similar looking printout made on your own site.

The problem is what do we make it say? Well, very often the letter one has received has a signs. someone like him and an once address at the top. This can be useful aince the chances are that the punch girl who reads it will probably not recognise the significance of the name and address. Of course, the code number needs to be changed slightly in case the address is irrelevant but unless it is made realistic it will probably fail ne :like him

alidation. The trick here is to smudge of obliterate it such that the name and address are the only usable data items.

Dr DENNIS JONES
ICL Project Team,
UKAE

Ouadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Thursday, March 11, 1982

Legitimate help or subsidy?

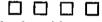
A CAMPAIGN launched by the Computing Services Association to press the government to spend more money with CSA members fits nicely into two planks of the government's strategy: to cut the size of the Civil Service and to switch jobs from public to private sectors.

The public sector in question here is DP spending directed by the Central Computer and Telecommunications Agency (CCTA). The policy wanted is one of "enlightened" procurement. (It seems that Kenneth Baker's euphemistic language has spilled over from the Department of Industry to infect the CSA.)

The CSA believes that by making greater use of outside service companies, the public purse would receive the benefit of the productivity gains it claims for thrusting private

Its request for a policy on government spending on softwere is made from an apparent position of strength. The CSA quotes a 25% compound growth rate for UK service companies between 1971 and 1980, which has taken revenues for the sector from £69 million to over £500 mil-

But the companies complain their success has been without the help of business they should receive from the govemment. The CSA points to the US where government spending on outside services comes to over \$4 billion, or 27% of their total billings. In France the figure is something over 20%. Compare that with CCTA spending in 1979-80 of £12 million, or under 3% of sales.



CSA members claim that without government support via a new procurement policy, British software and other service companies risk losing international competitiveness. They say that the most lucrative areas for new business are in health, education and energy, but that they are not gitting enough experience in developing all-important reference sites at home. Without them, they are handicapped inchasing work abroad.

But why shouldn't the government do its own programming, after all? Doesn't the call for support for the CSA

The CSA would justifiably be indignant if it was lumped together with less fortunate chunks of British industry in needing government work to survive - The "Buy British not because it's best but because our old-fashioned business will go under if you don't" syndrome. Clearly, its members are not in that class.

It does, however, run the risk of stirring up powerful antagonism. On launching their campaign, CSA leaders made passing reference to its impact on government em-

The jobs of the estimated 15,000 staff in government data processing (excluding data prep) should be guaranteed, they say, but future growth should be taken up by private companies. State employees would get the advantage of technology transfer from the private sector, and the country as a whole would gain.



There needs to be some demonstration that services to the texpayer would improve because taxes went on private rather than public spending. Despite Tory philosophy, it doesn't necessarily follow,

Where the CSA has hit the nail on the head is in its call for less secrecy on the bidding for potential contracts, on how they were awarded, on the price of the winning bid, and on completion dates. That information is not available.

It is in everyone's interest to see the facts behind the decisions on where government spending on computer services goes. Apart from the equity of such a procedure, it would follow a path well trodden by other governments which are more open - notably the US. And it is something on which trade unions, government data processing management and the CSA could unite.

1984 and all that . . .

THIS week's example of the strange things people say about computers was sent in by E. L. Smith of Blackburn, Lancs, who

wan gs.

Chief Inspector Alan Richardson, in charge of the welfare department at Lancashire Police Headquarters at Hutton, said:
The computer doesn't read after 99. I think that is the Season case with computers. So they have had to start him off again. The computer now thinks he is one year old."

Lancashire Evening Telegraph

LETTERS I

Cobol revision pros and cons

REFER to the two articles concerning the proposed Cobol revision by Philip Brown and Alan Morrison (CW, November 5, 1981).

The article by Philip Brown had

The article by Philip Brown had as its theme "although there are many changes, this should not give rise to many problems". This is in my opinion not true. I think they will give rise to problems in the Cobol. following three areas:
a) Financial. The conversion of

existing programs to conform to the new standard will cost money both in manpower and in machine further specific objections: time. The extent and number of changes will affect this, although not so greatly.
b) Company risks. However much (DBMS) facilities." I can entirely agree with this. The Netherlands

converted programs are carefully tested, it cannot always be 100% certain that they will execute in the same way as the old versions. c) Delay. Conversion and testing will require time, that could otherwise be spent on improving existing programs or creating new then cites examples of features that are not part of the proposed minimum Cobol, but are included

Conversely, the article by Alan Morrison carried the theme "the disadvantages of the changes are by definition greater than the advantages; therefore, let's not lowing points emerge:
a. COMPUTE, SEARCH,
SEARCH ALL, STRING and

This standpoint strikes me as much too rigid. Changes will often bring disadvantages with them, but that in itself may not be the sole criterion for making the decision to change. I personally try to assess the changes with the following criteria:

a) The change must be required because it covers: an existing fea-

agree that INITIALIZE should be because it covers: an existing fea-ture which has become totally obincluded in minimum Cobol. EVALUATE, however, should solete; or a new feature related to not be included because of its comnew hardware and/or software; or a change in a feature that attains a c. INSPECT, currently in new hardware and/or software; or

minimum Cobol, is not in the pro-posed minimum Cobol. I agree that INSPECT should remain. d. In the proposed minimum Cobol there is no Relative O or Incurrent minimum Coboll

It must not be forgotten that extensions can always be permitted. For example, manufacturers of microcomputers with In my opinion more items that floppy discs may decide to include appear in the proposed revision their Cobol compilers.
In conclusion, I think that the Alan Morrison names two

proposed Cobol revision contains The ommission of any Datasuch well-qualified elements that base Management System the negative points cannot outweigh them. My preference is therefore to give that proposed Co-Cobol Committee has strongly urged ANSI to take up DBMS bol revision a positive vote.

I would stress that this repre-

facilities in the next revision, or to announce a DBMS addendum. sents my personal view only, and should not be taken as an indica-"The (minimum) subset is virtion of how the Netherlands will tually worthless to the user." He eventually vote. WIM EBBINKHUIISEN

Chairman Netherlands Cobol Committee.

IF an "... ELSE DO NOTH-ING" construct is required for a Cobol statement, what's wrong with "... BLSE NEXT SENTENCE"?

Personally, I'd like to see "PERFORM . . . DEPEND-ING" and even "CALL . . . DE-PENDING" options imple-

Perhaps there would be a case for the compiler's ignoring everything in square brackets [], say, thereby encouraging the use of

Computer room replaces golf-club

have sold the system to a number

Bostik, Lombard Insurance, Bishops Stores and Kwik-fit Euro, as well as to companies in Hong

Kong, Australia and South Africa.

The first ICL version of the

. TAKE ME TO THE

.. IT'S THE ONE PLACE

STATIC MAT

I'LL GET AN ANTI-

SANCE SANCE

by Don

25

in the high levels.

If we consider the low levels of

num Cobol, then the fol-

the present Cobol standard also as

UNSTRING are not in the pro-

posed minimum Cobol. Neither

re they in the present minimum

D. BVALUATE and INITIA-

LIZE (new statements) are not in the proposed minimum Cobol. I

NON-GOLFING DPMs are probably now in the depths of despon-dency at Alan Simpson's sugges-tion that patronage of the golf club is more significant than a successful work record in the career stakes (Focus, CW, Feb-

ruary 18). Perhaps, however, a means of competing with their low-handicap orethren is to be found elsewhere in Mr Simpson's article. He speaks in disparaging terms of computer room "visits"; but surely these are

article ME29 Users will get GL/Plus Financial Management. System (CW, February 18), I should point out the following:

Package Programs Ltd (PPL) has had an ICL ME29 version of the MMS General Ledger and

Pinancial Reporting System avail-

able for the past year. The first

OK - NOW I'VE BEEN

I BELIEVE IT'S

B.

COMPUTER-BASED ...

ROUND THE BARBICAN.

Liveware File

Simply convert the tape library into the 19th hole, and get to know the chairman in the chummy way achieved in the togetherness of the visitors, rather than curse

More seriously, computer room visits may be unwelcome, but they are an inevitable fact of DP man-agement life. They also underline the need to have effective control monitoring — i.e. a selective alarm system that will indicate to the

high-level, intimacy-exchanging contacts afforded by the golf club. shift leader that a visitor (rather than an authorised member of the than an authorised member of the computer staff) has entered, and It is more sensible and less disruptive for DPMs to equip the computer room properly to deal

COMMANDER R. N. D.

that visits should have to be

Managing director Mastiff Security Systems Ltd Leatherhead, Surrey.

installations in the UK, plus more

than 40 overseas.

PPL-MMS Ltd

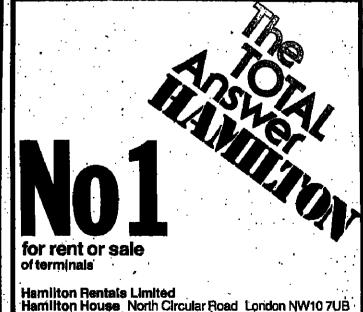
London, SE1.

ME29 financial package exists now

British micro I NOTE you refer to only three British manufacturers in your list of Central Computer and Telecominstallation was in Pebruary 1981 at Connaught Laboratories in Toronto, Canada and since then we and installed by PPL in 1974 and munications Agency approved microcomputers (CW, February we currently have over 45 ICL

Our Equinox 200-32, which is on the CCTA list, is a British designed and built machine. M. S. KÜSMIRAK

Equinox Computer Systems Ltd London EC2.



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Central Scotland 0501 43182 Aberdeen 0224-25301

ONE of the duties befalling a computer expert such as your humble chad is to answer technical queries from the public.

"Hello, could you tell me who is the largest manufacturer of computer hardware in the UK?"

"ICL, of course,"

"What does ICL stand for?"
It appears that ICL stands for pather too much anonymity.

■by Andrew Thomas Increased performance and cost-cuts could soon make night and weekend jobs a thing of the past

A book to be published next month, listing available contractors has angered the agencies . . . This week we ask why Agencies upset over direct recruitment bid

directory, which will publish the names, addresses and career de-tails of people who at the time of publishing were available for

directory, approach potential contractors, arrange interviews, and negotiate terms directly thereby eliminating the agency's Cut, which is typically 25 to 30 per cent of the company's fee. This could be shared between the

contractor and the company. At least this is what the directory's publisher, London-based DP Recruitment Ltd (DPRL)

AN attack is being made on the agencies which so far have dominated the contract programming market. It comes in the form of a district programming ten when companies fail to take

The answer depends directly on the response from interested comtors sending in their CVs. Since the latter have only the cost of a stamp to lose, that would seem to

DPRL was aiming to have details of 1,500 contractors in the first edition of the directory, due

DP Recruitment Ltd (DPRL) In fact, DPRL has done better than this. "Already we have had



NORRIS (left) and NICHOLLS of Computastaff . . . Sceptical that companies will take on the donkey work

tisement," says Thomas Kaye, a director of DPRL, who adds that at this rate he will have every contractor in Britain on his books

The contractor may have noth-

ing to lose by submitting a CV to the directory, but what of com-panies used to letting an agent find They will not be so keen, say the

> Norris points out that a com-cany setting out to hire contractors from the directory would probably have to make dozens of phone calls o people who have already found ork, or who just don't just want e particular job. In other words, donkey work usually done by.

Another large agency, KPG Computer Support, with offices in a converted cottage in Richmond, elieves that most companies value personal service too much to risk

than our competitors," claims KPG managing director Brian

KPG's manager of systems pro-ramming, Frank Swift, who was ired partly to implement this hired partly to implement this "stiff interview" policy, makes the same point more strongly. "Some big and small agencies are no more than photocopying units," he photocopying units," he , while declining to name

managers want is to be given the CVs of just a few suitable contrac-Alan Norris, chairman of Londonbased_recruitment agency Compu-

aking people from a directory.
"We make more effort in-erviewing prospective contractors managing director Brian

Of the agencies Computer Weekly spoke to, only the London-based VLI Group said it night consider offering a rival service. "We are watching the contractors directory scene

ably not before next year.

Kaye defends the wording sying that it was merely meant to warn people of possible legislation some time this year, and not to create a sudden panic. tirelessly crunching numbers as their masters alept. But someone Yet there is at least one contracoperators came into being, to en-sure that all went well in the small tor who claims to have replied to hours. Because of the unsocial hours additional remuneration was

Íby Philip Hunter

closely," says VLI marketing director Anthony Lambie.

The first advertisement for NCCD in Computer Weekly, February 18, angered some of the agencies.

agencies.

They felt it gave the false inpression that contractors who establish limited companies and still find work through agencies will have 30% of their income deducted from April 1982.

The offending sentence was: "It now appears certain that, from April 5, 1982, those contracting companies who find work through agencies, will have 30% of their income deducted."

The Treasury has made it close that no such legislation will take effect this April. There may be legislation in the future, but problems to be for a part was

the advertisement through fear of possible rax changes.

Keith Rolley went contract a

an analyst last year, working for an agency called Span. "I was worked at the possible loss of 30% because of the cash flow problems it would cause," he says. "I just couldn't afford to lose that money."

A contractor who put details up to NCCD for a different reason Andrew Ballantine, a specialist in PDP operating systems. "I think the directory is a good idea because the agencies take too much of the cake," he says. But Ballantine's main reason for

kept running. Twenty-four hours, even days a week cover could be wanting to be listed in the direc-tory is the free publicity. "Work provided by the manufacturers at a price which appeared low in comparison with the cost of the cause not enough people know about me," he laments. But massive reductions in the cost of hardware in recent times

Whether many companies will take the directory remains to be seen, but Kaye claims that DPRL has already heard from many in

place for those agencies who pro-vide a valid service and we aim only at companies who want to take on staff from a directory," he

day. The time is fast approaching when cheap, powerful machines will be run only between nine and It is a pity that the directory's inaugural advertisement should, for all its gloss, contain a few slips five. Evening, night, and weekend working will become a thing of the

One glaring error was the omission from the contractor's application form of a request for one vital piece of information — the telephone number. A senior field engineer told me this week that the number of sites

were very expensive and to recoup standby at other times To illustrate his point he told me

Operators face

9-to-5 working

a shift to

the enormous capital outlay com-

offered, in the form of shift allow-

These allowances raised salaries

to the point where operating be-came one of the highest paid jobs an unqualified person could find,

with excellent prospects for

computers were not only expen-

sive, but required constant engineering attention if they were to be

has meant that the need to wring every last ounce of performance

m of computers has reduced dra-

matcally.

Suddenly, computer users are realising that with the increased performance and reduced capital

outlay, today's machines do not

have to be run all day and every

mance and reduced capital

panies running computers were obliged to get the most out of them. This meant keeping the beasts running long after all self-respecting people had gone home.

All through the night they ran, that his company's small main-frame was now priced to be comfor an installation with one of these machines to buy another and to orgo running two or three shifts and providing engineering cover

This has an obvious and significant effect on operations staff. Running two machines on one shift does not require double the shift working on a single processor. If there are currently two or three shifts employed, and the management brings in another processor, someone will become

Checking within ICL revealed a definite trend towards prime shift-only working, as reflected by its maintenance contracts with customer sites. A spokesman said that, at present, the change is apparent at the smaller end of the market, among the System 25s and

support. The company now offers engineering cover on a two days a week basis, which both ICL and

which are showing the trend at the noment, it can only be a matter of

I would be interested to hea from those whose site has changed or is in the process of changing, its shift system. Perhaps overtime is more infrequent now or engi-neering cover is not available at weekends. Perhaps that new or job security.

Look out for the signs of approaching loss of shift allowance



Will operators' chairs soon be occupied only during the day shift?

Give all programs a jobname

by Colin O'Kecfe

IBM-compatible machines must meet very tight constraints before market. For example, machines of the System 370 class must be fully compatible in all areas of operaon, except for three types of program: Model-dependent programs; time-dependent programs; and programs which cause deliberate machine checks.

While the first two are unlikely to concern an operator, the third type is often written as part of a maintenance suite, and would therefore be under the jurisdiction

This suite could easily be run on new hardware for which it was not designed, and could as a result produce a meaningless output.

To prevent this, it would be a good idea to give all programs de-signed for a specific model number a jobname containing that suites can be updated accordingly

Announcing . . .

UUMPFG SCOTLAND

. . . Scotland's own professional computer show.

The highly successful Compec exhibition of computers, systems, perlpherals and software is to be held in Scotland for the first time this year.

Compec Scotland in Glasgow between September 7-9, 1982 will allow companies selling into this important market to focus on computer users throughout the country.

Surveys of visitors to computer exhibitions demonstrate that users prefer to attend a show which is local to them. Compec North was enthusiastically welcomed in Manchester last year, and has expanded for the 1982 event in June.

Now Compec Scotland with a venue in the centre of Glasgow ensures a place at the heart of another key market.

For information about exhibiting at Compec Scotland contact Chris Timmins, Executive Director, IPC Exhibitions on 01-643 8040 Ext 4869. Or clip the coupon.

Another successful Cumuler Weekly show.

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Why software testing is lagging behind

IT is possibly an inevitable consequence of human nature that soft-ware testing is the least advanced

Since most analysts would agree that testing consumes half of total development time, why else is it lagging behind? Certainly not through a lack of techniques.

In theory, any program can be proved mathematically correct by analysing every possible pathway, although this is not practical for large interactive systems,
But a number of common sense

But a number of common sense methods can be applied to simplify testing and minimise the risk of embarrassing bugs being exposed at a late stage when their elimination is more costly.

Common recommendations include liberal printout of intermediate résults of program execution at the development stage, constant checks of outputs from standard test sets, and the searching examination of boundary values.

So called "off by one errors" are a constant source of crashes, and are not sliving evisy to find.

But a slightly more contentious recommendation is making the testers independent of the designers and coders.

It is human nature not to spot one's own mistakes, but employ-

expensive and often counter-pro-

be read by someone who has been involved with the project, but not with the code itself, or by someone independent of the whole project.

But as for the overall testing in the code itself, and the code itself, or by someone in the code itself, or by someone in the code itself.

special testing group. So long a catablished techniques are religiously applied, it can be carried out well enough by the defeel there is not always a

velopment team.

Their intricate knowledge of the code can be a bonus as well as a

PUZZLER PPP PPxPPPP PPPP

PPPPP

ALL 18 numbers in this plication sum are Prime (2, 3, 50). Can you work out the indi vidual identifies? See page 47 for solution.

Everybody out' when new boss arrived

by Andrew Thomas
A CERTAIN British computer
manufacturer decided that it was
dine to inject some new blood into

its customer engineering division, and obtained the services of a customer services manager from a very large American computer

Here was a man with experience of field engineering in the white heat of transatiantic technical know-how, If anyone could inject tome dynamism into the UK engineers, this was the man.

from at a major site. In a room with accommodation for eight ensures, he found but one, quietly catching up with a large pile of fault reports.

arising a problem which could take some solving, given the present incumbent of the management position.

"How am I going to explain to a customer that I can't fix his machine because I've got to go to a

here when there's nothing to do,"

replied the puzzled engineer.

"Ah, silly of me," said the manager sheepishly, "I'm used to an office environment where people not being at their desks means n work's being done."
"I see," replied the engineer

how much knowledge of field en neering his new master actually

The engineer's thoughts were given more food by the announce ment some days later of monthly meetings involving all field engi-neers being called in to a central location to discuss any problems encountered, and to find solutions Unfortunately, the initial impression created by the new chief engineer proved to be somewhat that impressive than his employers might have hoped.

On the total of his new empire to inspect the troops", he burst dynamically into an engineers' to make a more solving, given the present forcing at a make a make a more solving, given the present forcing at a make a make a more solving, given the present forcing the management.

Where the hell is everyone? Staff meeting?"

Where the hell is everyone? Staff meeting?"

Perhaps operations managers will be investing in chains and padlocks to ensure that, once they get an engineer on site, they can keep him there.



Peripherals '82 will feature the very latest in terminals, VDUs, printers, plotters, memory products, graphic displays, tape and disc drives - an exhibition for anyone with purchasing responsibility in the computer peripherals field. This professional exhibition - presented by the Peripherals Suppliers Association and Systems International - is the annual opportunity for those requiring computer peripherals to discuss their needs with specialist suppliers.

March 31 - April 2, 1982 10.00 - 17.30 (closing at 16.00 on the last day) West Centre Hotel, Lillie Road, London SW6

Admission, by business registration, is free of charge. Plan your visit now and save time on arrival by sending for your registration leaflet in advance.

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Managing director for micro supplier

tion company, as managing direc-tor. He will be based at the com-

Hardware

ENCOTEL Systems, a UK distri-butor of the Superbrain minicom-puter, has appointed John Burch butor of the Superbrain minicomputer, has appointed John Burch as hardware support manager. He will be responsible for the company's new engineering facility at Croydon and will have nine engineers reporting to him. Before joining the company he worked on GEC's System X, Rediffusion's VCR, Prestel and teletext services at GiC and Rediffusion. VCR, Prestel and teletext services at GEC and Rediffusion.

Alan Salter has joined R&H Systems as regional sales manager for the East and South-east. He was previously with Terminal Display Systems. Peter Kerrigan is pre- and post-sales support engi-neer. He was formerly with R&H's engineering service group. Joining

for the Qume range of terminals.

BUSINESS microcomputer supplier Micro Networks has appointed Bernd Lissok, formerly finance manager with a combustion company as managing directions.

tor. He will be based at the company's Pall Mall premises.

Lissok joins the company from East Hill Mill, where he was responsible for managing director of Micro Networks, Lissok aims to make the company "a significant force in end-user microcomputers" by ponsible for managing the design, building and staffing of an enter-best systems industry has to offer, best systems industry has to offer, lainment complex, worth £1 million, at Ashford, Kent.



Stewart Shine and Richard White have joined P&O Computer Services' consultancy division. Shine, who joins as senior consultant, has been a programmer, analyst and project leader. White was previously with Data General

Systems based in Blackburn, Lancs. OEM, where he managed the im-plementation of business systems applications in London and the

Roger Crumpton has joined

Westward Micro Systems as sales manager for the company's new sales

peration. The company now sells lirect to OEMs and end users, rather

■ Duncan Dempster Smith has been appointed microcomputer

Hans Hauk-Rogers, former technical director at BMG Microsystems, has joined Farnborough-based Clearsons, as director. His appointment at Clearsons will strengthen the COMM market. Clearsons has recently opened a cash and carry computer. than through distributors. Crumpton was formerly Northern region sales manager at Terminal Display opened a cash and carry computer and WP supplies store in Hampshire, consultant at BSL Microcentre in

■ Bob Randle has been appointed marketing manager at Compex Computer Services. He previously

alaysts and data dictionary. He will also help to develop the company; training programme on Oracle, the relational database management system for which CACI has the tole UK marketing rights. held senior sales position with BOC and Hoskyns. Bournemouth. He was previously accounts manager at NCR.

MARCH 18

Peter Cowan has been promoted to international sales manager from UK sales manager

International as a consultant

DIARY MARCH 15

North Atlantic air traffic control. BCS Glasgow branch. The Music Room, Staff Club, University of Strathclyde, John Street, Glasgow. 7.00.

MARCH 16 Word processing and informa-tion retrieval. BCS Word Processing/Information Retrieval and Office Automation Groups. Details from Steve Pollitt on (0484) 22288 ext 2248.

Auditor's view of microproces-sors. Joint meeting of BCS Bir-mingham branch and Institute of Internal Auditors. West Midlands County Hall, City Centre, Bir-mingham. 6.30.

Meeting of the Committee for the Disabled. BCS. BCS HQ, Mansfield Street, London. 5.00. System X. BCS Edinburgh branch. Mountbatten Building, Heriot-Watt University, Grass-market, Edinburgh. 6.00.

Computer mail in the automated office. IRE. IEB, Savoy Place, 2 Savoy Hill, London. Details in 01-240 1871.

User interface techniques. BCS Kingston branch. Kingston Polytechnic, Penrhyn Road, Kingston-upon-Thames, Surrey.

Privacy. BCS Manchester branch. Manchester Business School, Booth Street West, Man-chester. 6.45.

Pascal: Son of Algol, Mother of Ada. BCS Preston and District

branch. Saxon Motel, Blackburn

Joint meeting of BCS and SCHE. BCS Hampshire branch. Mountbatten Theatre, Southampton College of Higher Education.

Image processing for the Saum project. BCS Central London branch. Charing Cross Hotel, The Strand, London. 6.00.

Personal computing and the Acorn Proton. BCS Merseyaid branch. Science Lecture Theatre Liverpool University, Brownlow Hill, Liverpool. 6.00.

MARCH 24

Presentation by R. B. Barnes general manager, Computer Group CWS. IDPM North-Western branch. New Century House, Corporation Street, Manchester. 6.30.

MARCH 31

Annual General Meeting, IDPM Jorfolk branch, Castle Hotel Norfolk branc Norfolk, 7.45.

Communications between users and computer people. Joint meeting of IDPM Kent branch and Chartered Institute of Secretaries.

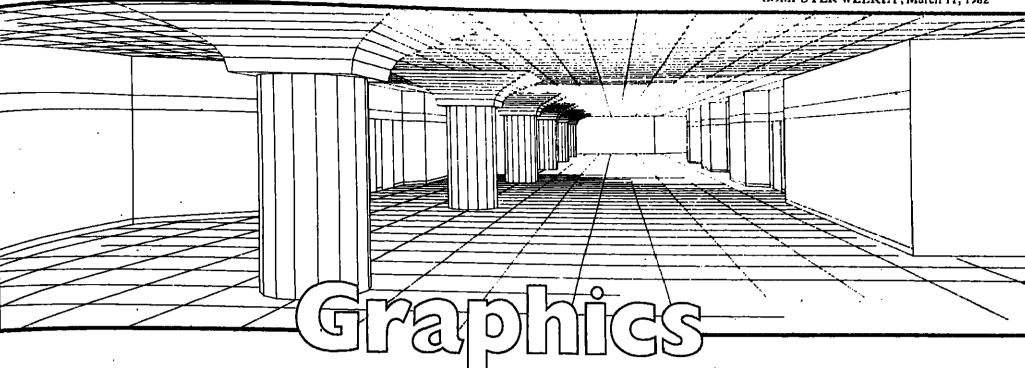
Meeting of IBM Guide SET group, re-scheduled from January 14. IBM, Wigmore Street, Los-

You may be interested in the

European Unix User Group

lur next meeting will be held in Paria where we shall also be holding an

31-35 Gressmerke Edinburgh EH1 2H



IMAGES have been used to represent concepts from the beginning of time itself. The paintings of

and so there had be a better way of showing, say 20 bags of grain, than by laboriously drawing each one. Conceptual symbols served the purpose better, and numerical systems were born.

Today, a company executive absorbing such an increase in productivity, not necessarily the engineer. The engineer gets insight into complex problems by exposure to detail, not by pressing a button to automate tedious tasks.

Nevertheless, the productive search of the productive search

Today, a company executive uses graphics to represent numbers if he wants to convince his boss of some ambitious plans numbers if he wants to convince his boss of some ambitious plans without boring him with confusing

Vendors of graphics equipment from 20 in 1974 to 65 this year.

According to Frost and Sullivan*, turnkey graphics systems from US companies like Computervision, Calma and Applicon show the highest growth potential in the European state with sales. then to a very down-to-earth spreach to sell their kit. Graphies, they say, saves time and money, improves decision-mak-leg, boosts productivity, makes luces errors, provides insight into complex problems, and so on.

Even the present government, widely considered more tight-fisted than previous administrations, is to spend £9 million in one pecific area, printed circuit deign, just to convince smaller companies of the arguments for using computer graphics. It has also ear-marked 25 million for a similar "swareness" programme in com-puter-aided design/computer-aided manufacturing (CAD/

Citing productivity as its nationale, the government plans to hold its first seminar in June, with the first course beginning in September. Some proponents of the scheme claim that five-fold productivity improvement can be achieved with the use of CAD.

Three countries But according to another school of thought it is the basic tools themselves which are capable of graphics equipment in Europe.

Trust trapbles have breathed new life into the art of film animation.

month, CAD82, where the

in the European market with sales

increasing at the rate of 50% a

Frost and Sullivan predicts

puters with graphics capabilities confuses the figures.

Suppliers of graphics software in the UK include Applied Research of Cambridge, the Central and competition nibbles away at Electricity Generating Board, profit margins. Despite the increasing trend for Compeda (a National Research exchange between European Development Corp subsidiary), Computational Mechanics, the countries, most computer graphics equipment manufactured in the

European market is heading

Computer Aided Design Centre in Cambridge, Eclipse Computer Services and the National Engi-A scattering of UK research academics previously supported by Department of Industry funding will contribute to an average market growth of 30% a year for computer graphics, according to Frost and Sullivan.

and Applicon as turnkey systems suppliers," says Frost and Sulli-In the remainder of Europe, the main suppliers of computer graphics software include CISI and CERCI in France, Institut Battelle in Switzerland, Aristo in Germany and Olivetti in Italy.

year. About 600 systems of this In 1985 the use of computers in kind have been installed around graphics will have grown only about 140% from 1979 as a base year, whereas dedicated graphics competition in specific market seg-ments such as printed circuit de-sign from indigenous European suppliers like Racal-Redac in the UK and CERCI in France. quipment will have grown by bout 230% and graphics software by 250%, according to Frost and

The computer graphics market in Europe is estimated at about \$458 million in 1980, of which over 90% was imported from the US, and roughly \$13 million repre-European graphics market of \$3 billion in 1990 from \$290 million in 1979, with industrial applica-tions increasing seven-fold. Sales of graphics equipment to users in business and education will grow, it is forecast, from \$45 million in 1980 to \$500 million in 1990, sl-though the sale of desk-top computers with graphics capabilities sented exchange between European countries. Computer graphics represented 7% in value of computer imports from the US but there is an increasing trend for exchange between EEC member countries and a relative reduction in imports from the US.

The overall market is expecte

of time itself. The paintings of evemen attempted to communicate more than just the intrinsic images of men chasing animals with spears.

With computer graphics only the tools have changed, but the basic principle remains. Early man soon found that iconic images—those which represent the physical forms of objects—had limited andication.

Suppliers of graphics software in the UK include Applied Research of Cambridge, the Central and competition nibbles away at in the application areas of the devices by suppliers of graphics equipment. Future developments in the application areas of image processing will include automated drafting, design, monitoring and control, management decision.

> making, graphics art and reprogra-phy, page make-up, computer out-put microfilm and laser imaging UK is produced by subsidiaries of US companies.
>
> "The leading companies are and will remain Tektronix and Versatec as peripheral suppliers, Digital Equipment (DEC) and Hewlett-

control, management decision

Graphics animation will also be used in educational applications, providing the ability to create moving images and cartoons.

Business applications will include the ability to visualise numerical data and to the starting

merical data and to transmit graphs and images in office auto-mation. Executives will be able to perform marketing analyses and to examine financial strategies by

simulating results of changes in parameters. They can be provided with management aids for projects in the form of critical path analyses which may be updated at different phases of the project as necessary.

The use of colour may be added to draw attention to significant values to pictures with text and graphics.

graphics.
Business graphics requires re-presentation of data in two dimenions whereas industrial graphics invariably requires the representa-tion of objects in three, Geometrical aspects have to be shown as well as the representation of the material itself and the state of its surface. This usually calls for large

memory capacities.

Despite the embarrassingly ppointing market reaction to Prestel, viewdata is recognised as a cheap method of communicating mages and second generation edit-ing terminals are expected to provide more computer graphics

*Computer graphics in EEC industrial markets and Computer graphics equip-ment in BEC business markets published in April and December 1981 by Frost and Sullivan, 104-112 Marylebone Lane, Lon-don W1.

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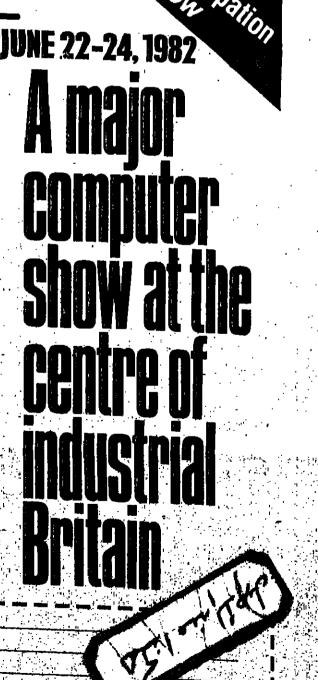
Do you use UNIX*

or any Unix-based or Unix-like system?

pen Meeting. At this the major vendors of Unix and Unix-like systems will s exhibiting and giving presentations on their products. For further formalion on membership of the EUUG contact







Compec North was launched in 1981 to serve the computer requirements of end users, the OEM market and other computer companies in the North of England. The exhibition was outstandingly successful, filling the industry's need for a well-organised and well-promoted computer show in that part of the country. Compec North attracted 4,271 top quality visitors - from an impressive range of organisations, including: Banking, finance and insurance; telecommunications, electronics and engineering; construction, metallurgy and chemicals; printing, research and large retail groups; large manufacturing companies, the major nationalised industries, national and local government establishments; police and the armed forces. The success Compec North's combination of content. location and visitor profile guaranteed a hugely successful exhibition for all concerned strongly confirmed by just some of the exhibitors' comments:

"Provides business for a long time ahead" in the angle of the long time and time and the long time and the long time and the long time and time and the long time and All the visitors seemed to be real prospects and came from a good geographic spread! Case (Computer and Systems) Engineering Ltd

"Well organised, valuable and about time there

was a show in the North": Control Data Ltd

Return to Exhibition Manager, Corriped North 82, IPC Exhibitions Ltd. Surrey House, 1 Throwley Way, Sutton, Surrey, SM1 4QQ Tel: 01 643 8040 EXT 4893

Please sand mote details and contact me regarding a stand reservation.

Graphics has become an essential tool for those controlling company finance . . . David Casey reports A good picture is worth a thousand words when passing on information

formation content communicated through a video display — an electronic blackboard which has pervaded every sector of the busiiess community during the past five years. In many corporate finance departments, the screen has replaced the printed page as the first contact with statistical and inancial information; a hard copy is extracted from the computer

only for longer term reference.

Down on the shop floor. progress is monitored on VDUs, a nedium well able to handle production information which is constantly changing.

Systems able to mould raw staisticul information into a graphic display are not a new deelopment, however. In the field computer-sided design, terminais which can interpret arrays of mathematical equations as threedimensional representations on the screen have helped to simplify complex engineering projects.

Integrated circuit design, a

process which evolved from the ayout of printed circuit boards,

market areas during the next five form. years. The small design team is a prime target for system suppliers currently experiencing resistance to CAD equipment priced at £160,000 or more. Computervitional channel of communication. the early 1970s, recently intro-duced the Designer M series specifically for this smaller scale

There is an increasing range of

NEWSPAPER journalists are well aware that a good picture is worth a thousand words.

No less important is the in-

With trends in management towards the greater disclosure of information computer graphics will help provide an interface between contrasting disciplines. From their professional training, the accoun-

With trends in management towards the greater disclosure of information. computer graphics will help provide an interface between contrasting disciplines

tants in an organisation are able to gauge a company's performance using only a handful of key financial statistics.

Communicating the same in-formation to technical personnel or owes much to the interactive capa-bilities of computer graphics: trades union representatives re-quires a very different approach: Growth in the computer graphics sector will be focused on two

sion, a company which has dominated European CAD sales since the computer to the observer, with There is an increasing range of

A feature now available on the Computervision systems is three-dimensional "solid modelling", in

ntegrated circuit design owes much to computer graphics:

conventional planning technique in that the effect of proposed changes in a strategy may be moni-

From raw data entered through a series of prompt statements, a static model of a company is de-veloped as the first step. The critical factor, cash flow, is bud-geted for future trading periods; the timescale of the forecast being determined by the availability of

The model of the company which evolves is expressed as successive columns of data representing weekly or monthly cash movements. At best, the table is a projection of a business based on a

single set of inputs.

Modifying any of the key parameters of the business on a "what if?" basis generates a revised model which may differ from the first approximation in only a few of the component figures: the impact of these variations may be apparent only to the trained financial eye. Interpreting the same models on a graphics display terminal will highlight changes for management whose role it is to appreciate corporate performance without having to understand the accounting principles

By basing hardware design on conventional terminals wherever possible, manufacturers have been able to bring full graphics capabilities within the scope of the smaller business market. On its HP125 Business Assistant, Hewlett-Packard has introduced colour graphics as a standard feature. Controlle through menus of options, the Graphics/125 software interacts with other packages — including word processing and Basic — run-

ning on the same system. Since the interactive financial modelling system Visicale is also supported by the HP125, it follows that trial models of a company can be converted into pie charts, sev-eral types of bar chart, or conven-tional X-Y graphs. Outputting the contents of the screen to a multicolour plotter produces either a hard copy on paper, or a transparency for overhead projection.

With the enormous potential of its minicomputer user base to be rapped (there are an estimated 12,000 PDP-11 systems in the UK alone), Digital Equipment has introduced a range of graphics terminals. The VT125, for example, is a model in the VT100 series, which supports DEC's Remote Graphics Instruction Set (RHGIS). But the specialised graphics software for the VT125 can be used to upgrade an existing VT100 terminal. an existing VT100 terminal, providing: a relatively low-cost introduction to the technique.

Designed primarily for the edu-cational and smaller business markets, the GIGI graphics terminal from DEC uses the same REGIS software as the VT125, and supports a version of Basic for manipulating graphic symbols on the display. For integrating text with graphics, the DEC-RITE package on the system provides text input, and editing facilities;

and editing facilities.

Aiming at a similar user base the DEC VT125 product is Data General's Dasher D280C colour terminal. Compatible with the manufacturer's D100 and D200 terminals, the colour unit would be used in business applications where the creation of multi-coloured charts could improve communications. The isolation of business graphics as a definable market sector is accounting for an increasing share of the turnover of suppliers nor mally, associated with engineering



The effect of proposed changes in company strategy may be monitored with relative ease.

design systems. Calcomp is cur-rently placing 30% of its small plotters in commercial applications as diverse as market research (National Opinion Polls), strategic planning (Gallahers) and commod-ity broking.

The introduction of microcomputers with an inherent graphics capability will do much to promote sales of the cheaper graphics plot-ters. Calcomp software has been

The more familiar that a businessman becomes with the applications of greater is the likelihood that he will find a need

the technique, the for more sophisticated systems

modified for Apples, for example, with output to a colour plotter. Neil McLeod, the company marketing services manager believes that the "economy" micro pro-vides a valuable, if somewhat res-tricted, introduction to computer graphics. "The more familiar that a businessman becomes with the applications of the technique, the greater is the likelihood that he will find a need for a more sophisticated systems." ticated systems,"
MoLeod does not see a major

market arising however, from the development of actworks for micros. "The benefit of having a graphics output device linked to your own terminal is lost if the unit is at a remote point in the net-

While the development of business graphics systems owes much to the work of the CAD manufacturers, the lead in this field has been taken more recently by purpose-built display units. The Comshare Reccuchart is a unit designed specifically for the commercial market with the presumption that the user will have little knowledge of computer systems. Able to operate in six graphic modes, the standalone tarminal is supplied with a library of charts as an aid to designing meaningful displays. In wan a notary of charts as an aid to designing meaningful displays. In teraction between the operator and the system is improved using an electronic "mouse" on a desk-top digitiser to move the cursor around the acreen. This device rather than a conventional cursor control had, selects options from memis of commands which appear on the display.

The concept of a free-moving "mouse" on a control surface is also applied by Xerox on the 8010 Star information system, designed as an executive workstation. A Star unit provides a high definition black and white representation of both text and graphics; simulating a printed A4 page. In the Perq workstation being manufactured and marketed by

ICL, a hand-held input control not dissimilar to the Xerox mouse" — has replaced the single function graphics pen with which the system was first launched. A single Perq installation is based on a 16-bit CPU with between onequarter and 1 Mbyte of memory and a 24 Mbyte Winchester.

The standard to which information can be presented on the screen is exceptionally high, and is supported by software which allows user.

diagrams within a document. ing a raster screen refreshing a 60 Hz, Perq can support realistic animation. The system's ability to treat defined areas of the screen as separate display "windows" would allow a financial planning package to be run through one of these zones with the graphic results displayed simultaneously elsewhere on the screen. As part of a network of executive terminals the ICL system is able to commu-nicate directly with other Perq units, transmitting both conventional text and graphics.
With the Comshare Execuchant

and Xerox Star, Perq is indicative of the movement in the compung market towards products designed specifically to meet the graphics requirements of the management



Bob Brash compares graphics printers and vector plotters, and looks at some different methods of interfacing them

How to pick the best hard copy method

NO computer graphics system is motors or by analogue DC motors. In each case data is processed digiwill be located wherever reference

has to be made to a diagram.

There are basically two distinct ways of producing a graphics These are raster and vector. This distinction applies both to visual display units and hard

copyunits.

For a visual display system the rester output is the most common since most displays have a continyour refresh system. The alternative is a storage tube type of display on which vectors are written and retained by the storage

Whichever display is used, the data is originally generated in vec-tor form. However, in the case of a raster display it is written into a memory which is then scanned in raster fashion in sync with the line scan of the cathode ray tube. Directly analogous to the raster

and storage tube CRTs used for visual display are the printer and XY plotter used for hard copy outoutput from the raster scan memory and reproduce it by scanuing the paper and placing dots in the appropriate places to build up a rector pattern. In the case of an XY plotter information is sent in its original form and this is aslated into a controlled motion of the pen to produce the required vector on the paper. It is therefore possible to build up a complete graphics picture without having a faster scan type of memory (untally referred to as a bit map memory) to hold each resolution point within the picture area. This quite important when dealing high resolution displays, where the amount of memory reulted for such a bit map becomes

When comparing printer and vector plotters, it is difficult to say that one is better than the other; each has its place for certain applications. As a general rule, one would choose a vector plotter where quality of presentation and eccuracy are the most important estures and a printer/plotter where speed of output is most im-portant, particularly if there is a lot of alphanumeric data to be ded within the graphics plot. One would also use a vector plotter a cases where a large scale plot is

here are two basic types of vecplotter. First is the flat bed potter which has a pen or series of pensionaunted on a carriage which in turn is mounted on a moving santy such that the pen may be moved in two directions over a flat bed. This has been such as the pension over a flat ed. This has the advantage that he whole of the plotting area is

whole of the plotting area is visible during the plot and may be observed, without removing the paper. Data may be added to the sine sheet.

The second type is the drum plotter which is used particularly but yery large scale plotters where the sheer size of a flat bed plotter would be undesirable. In this system the paper is moved in one ystem the paper is moved in one direction by means of a revolving drum and the pen is moved in the other direction. Vector plotters tags in size from A4 size (28 cm long) up to A0 size and beyond (20 cm long).

It titler of these types of vector plotter the pen, santry or pages

tage the pen, gantry or paper It's a printeriplotter where speed of output is the key.

same way that a conventional business computer system needs a in digital form and presented to printer, even for occasional use the motor drive electronics. In the only, some form of hard copy is needed for graphics images because it is unlikely that terminals and step by step commands are given to the motor.

When a computer converses with an XY plotter, commands are sent to a vector plotter in exactly the same way as one would send a that is using a standard Ascii character set. In order to be able to interpret the characters presented to it a command language is required in which each action or operation of the plotter has a unique command format.

Unfortunately, no standard language for vector plotters has yet emerged and today almost every

Unfortunately no standard language for vector plotters has yet emerged and today almost every plotter on the market has its own different command structure

otter on the market has its own different command structure. This means that software has to be written for a particular plotter and alterations would generally have to be made to enable it to run on any other plotter, or at least a plotter from another manufacturer.

In addition to the drawing commands a number of other commands are available on most plot-ters for functions such as scaling, automatic pen changing, auto-matic advance of the paper where the unit has a chart advance attachment, in-built error checking facilities, and digitising. The digitising function is an interesting and useful function and one not available on printer plotters.

By means of the digitising controls one is able to move the position of the pen over the plotting surface manually, and to transmit the co-ordinates of any selected



and the plotter, and that some

overall plotting area of the plotter, and for identifying a location on the plot; for example where the plotter has previously drawn a map it can identify a particular location as word length and parity bits, it will be possible to transmit data and supply the co-ordinates of that

location to the computer.

The scaling facility is another important feature which allows the user to redefine the plotting units. The two most common terfaces used are the RS232 and the IEBE. Nearly all graphics plot-ters are compatible with one or the

other or both these interfaces. The RS232 is a long establishe interface used particularly to connect printers and mass storage devices to computers. With the RS232 interface, data is transmitted bit serial and this has the effect of minimising the number of interconnecting wires involved. Data is transmitted at one of several defined bit or baud rates along a single line and similarly received along a second line. These two lines are called the

TD and RD lines. In the simplest configuration is only necessary to use three wires TD, RD and Ground to connect a

from the computer to the vector plotter and similarly when using a digitised function to transmit data Provided that the vector plotter has an instruction buffer and the size of the buffer is adequate to

accommodate the largest plot required, then the three connections are all that is required to operate the system satisfactorily. The IEEE-488 or IEC625 in-

terface is a bit parallel byte serial interface invented in 1975 by Hewlett Packard. It is used particularly in the instrumentation field where a number of instruments are required to exchange data between themselves, and a particular fea-ture of it is that a number of instruments may be connected in

Type of Speed (character Fast Speed (vectors) Line qualit Resolution Multiple copies £2,500 £1,500

parallel on the same bus system Every system must have a controller and only one controller may be in charge of the flow of data at a given time; usually the bus

controller is a computer.
With this interface each of the peripherals on the bus is given a different bus address and is told when to talk and when to listen by

The IEEE specification and the IEC specification are electrically identical but the specification of the interconnecting plugs and sockets are, unfortunately, dif-

In comparing the two interfaces one can say that the IEEE interface is generally faster than the RS232 and requires less setting up; the only adjustment possible being selection of the bus address. It does, however, require many more interconnecting lines than the RS232 interface and has a limit on the maximum length of cable over which it will operate of about 20

Bob Brash is research and de-

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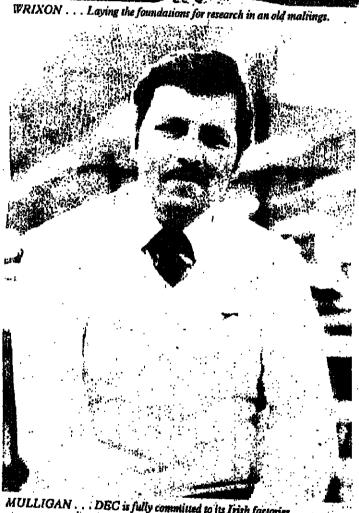
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Programming costs in India







YAMADA . . . Mixing socially is easy

Making a blue-chip certainty out of the Emerald Isle . . .

THE fastest growing computer in-dustry in the Western world is not to be found in any of the tradiis the place called by poets "the dark edge of Europe", the Irish Republic, where the computer sector is growing at an annual rate of

Admittedly, the Irish are starting from a very limited base in a country which was, and still is, predominantly agricultural.

But the country is faced by the problem of a huge decline in the labour needs of this sector, and dented rise in the population. By the end of the decade, it is ex-pected that over 50% of the work orce will be under 25.

In a bid to deal with this crisis the Irish government, and its investment arm the Industrial Development Authority, are spending up to £600 million annually on

attracting business.
This ambitious level of investment is being undertaken to give the country a stake in the industry of the future - electronics and

Investment by the IDA mainly takes the form of startup and development grants, but these are minor inducements compared with the 10% tax holiday which will last until the end of the century.

Some companies are still benefiting from an even greater concession, zero tax on manufactured exports. This has now been changed under pressure from the BEC Commission in Brussels, egged on by

envious development authority neighbours in EEC states.

But the Irish dodged the EEC's attempt to handicap them by creating a uniform rate of 10% on all Irish goods manufactured for

And a careful reading of the fine print in the country's tax laws makes it clear that a combination of capital training and other allowances can effectively bring even the nominal 10% down to zero.

The biggest single investment in the Irish computer industry was made ten years ago by DEC, which started a test and assembly plant in Galway in 1972. This now employs 800 people, although according to Charlie Mulligan, its Irish man-ager, DEC's original plan was for

Now DEC has two plants in Ireland, both manufacturing processors and VT 100 terminals. These are destined principally for DEC's huge European markets.

The problem of transportation of the products to Europe might be thought to be a serious obstacle,

but according to Mulligan the problem simply does not exist.
"It takes less than 24 hours to get computers to the UK, and most centres in Rurope are 48 hours at most from Galway," he

And telecommunications, for long the worst bugbear for all Leish industry, is finally coming right.

Two years ago, the government mched an ambitious £800 mil-

lion revamp of the country's antiquated and largely manual telephone system. Most of the new investment has been in the international links and exchanges that companies such as DEC must have, to maintain their online round-the-clock manufac-

turing systems.

In fact, if was pressure from companies like DBC and Amdahl which led to the changes. Mulligan reckons that it is often easier to get in touch with headquarters.

recisions that it is often easier to get in (ouch with headquarters, in Boston; now, than with some of his suppliers in remoter areas.

DEC in Galway, a relatively remote part of the country, has an annual employee turnover of less than 3%. Mulligan feels that some of this can be attributed to the company's enlightened employment policies, which carry heavy, training commitments with them,



Lush countryside and stately homes are all very well, booming industries to provide for its exploding population.

idiomatic local variety of English.

is very easy, once the initial shock

The IDA, though it is the envy

of many other development

authorities in Europe, has not been without its critics. A report from

the American consultancy Telesis, initiated under the Haughey government, was highly critical of the authority, suggesting that less than 30% of the jobs set up by it in the previous decade still existed at the time the previous decade still existed at the

ime the report was written in

But, in turn, the methods used by Telesis to compile the report came in for serious criticism even

before it was complete.
Under the coalition which fol-

lowed the Haughey government, the report seemed on the point of

being rejected, but the govern-

ment fell, and the report remains unpublished.

However, the IDA has shifted

but the scarcity of jobs in the West of Ireland must also be a factor. Productivity at the Galway plant is at least as good as in any of the parent's American plants, sometimes better, in Mulligan's

However, this problem of productivity is seen in a different light by the Japanese, who have recently begun to invest heavily in plants in Ireland.

> The Japanese seem to feel that they are more readily accepted in Ireland than in most other Western countries.

According to Ryosuke Namazu, the manager of Fujitsu's Dublin-based PCB plant, Irish productivity, though good, is not as good as that of the company's plants in Japan.

(But this might be said of many plants in Silicon Valley too, where punctuality and employee turnover are a permanent prob-

turnover are a permanent prob-

The Fujitsu plant is one of 10 or so Japanese computer and electronics factories which have recently been set up in Ireland.
According to the IDA, the Japanese seem to feel that they are more readily accepted in Ireland than in most other Western

This means that the IDA is encouraging all aspects of the indus-try, including basic electronics, software, and R&D, instead of

riuman resources

THE Irish government has made centre is being built with Americasource needed to sustain a by Professor Gerry Wrixon.

Signding among the billars of

a massive investment has made, resource needed to sustain a viable computer industry—educated people.

To staff more than 30,000 electronic and computer jobs the IDA hopes to create over the next six years, the country has rapidly expanded all forms of third-level (degree and HNI) standard) education, institutes of higher education have been set up in Limerick, Cork and Dublin.

The University of Cork has created a microelectronics research centre which can offer 15 to 30 postgraduate places, each year in each of the key micro occhaologies; gallium arsenide CMOS; thin and thick film, and Josephson innetion research.

Josephson junction research.

by Professor Gerry Wrixon.
Standing among the pillars of concrete which are rising in an old maltings on the banks of the River Lee, Wrixon says that the centre offers more scope than almost any other European centre for microelectronics research.

He is optimistic about the success of the current IDA policy of giving emphasis to the "full facilities" grants, which include generous encouragement to incoming companies to set up R&D facilities at their Irish plants.

Aiready Writton has completed work with Advanced Micro Development, an American company, which has begun full chip production at its Limerick plant.

concentrating on test and assembly plants to feed American and Japanese products into the EEC, duty

The authority's biggest recent coup was the capture of Gene Amdahl's Trilogy.

This company, to which the IDA has committed over £9 million in grants and aid, is setting up its principal manufacturing plant in Ireland. From the plant, which is expected to be in production and employing about 600 people by 1984, will come a new breed of

performance rating of around 45 million instructions per second. To produce the first of these machines, Amdahl and his panners, including the IDA, will have spent more than the UK government did on the whole De Loren car plant in Belfast.
Much of Ireland's success in at-

general purpose mainframe with a

tracting investment is attributed to the fact that the IDA is a "one-stop

shop".
David O'Donovan, the IDA's director in the UK, says that most companies planning to set up away from their home base want to avoid having to deal with a range of local, regional and national authorities in order to get their In fact, they get on very well with the Irish, despite the barrier factories operational. to communication created by the

"The IDA long ago organised itself so that it can provide, within its own resources, all the contacts This problem appears to be overcome by the fact that the Japa-nese companies like Sord and NEC start off slowly and try to delegate as much of the routine work as possible to the local staff.

And Michirio Yamada of Sord says that mixing socially in Ireland is very easy, once the initial chart. any company is likely to need in order to start operations. O'Donovan also points out that

the rate of return on investment in Ireland is double the BEC avenge, according to the US Department

The average rate of return on investment in Ireland is 33.7%, compared with 16.8% for the rest of the EEC. And this means that a company can recover the full cost of its investment in three years.

The US has probably now overtaken all other countries as the

largest foreign investor in compu-ter facilities in the Republic. Apart from IBM, almost all major US manufacturers have plant in Ire-land, although the Japanese come a close second to the Americans. One of the reasons quoted for

the IDA's success in persuading the Japanese to come to Ireland is the strong presence the organisa-tion has maintained in Tokyo. It arrived there before most other countries saw the benefits of attracting foreign investment.
One of the UK development

authority's Tokyo staff sourly commented that before a Japanese computer company finished thinking about a new project, someone had told the IDA staff in

its emphasis since the report was written. The computer industry is being courted with greater assuidity, but with more emphasis on providing a full commitment in Ireland. Jim Cashman, who has headed the IDA presence there for 20 years, says that the IDA are simply better organised than other agen-

> Cashman, who speaks Japanese, also says that patience is very imnese businessmen. It is true that h has plenty of it, and the payoff is well in evidence.

Ten Japanese companies, seven of them from the computer industry, now have plants in Ireland. They are to be joined by an eightly. Logic Systems, a small but rapidly growing micro builder.

Although it is never openly discussed, part of the motivation for the Japanese does spring from the threat of European protectionism. But in their view Europe is as important as the US, and also less difficult to enter. For the Americans the problem

is very much simpler, and some of them are even of Irish extraction. But the noticeable feature of the new Irish computer industry is the number of US companies headed by local Irish managers.

The Japanese, oh the other hand, seem to prefer to keep a

Japanese presence at the top.

Experienced software staff at a quarter the price are available in some Third World countries, says Ian Palmer

NO DP manager needs reminding of the ever increasing costs of his staff. Hardware costs may be plunging but salaries, fringe benefits, national insurance, pensions and other people related costs continue to grow.

Many solutions are being tried in attempts to resolve this

in attempts to resolve this problem. Fourth generation languages such as SQL, ADF and Focus are beginning to produce large productivity gains. Structured analysis, design and programming techniques are leading to smoother development projects and reduced systems maintenance. Data administration together with the use of a DBMS does eliminate much duplication of

But for all this, the application backlog remains, end users are tempted into trying to do their own thing on a mini or micro, and people costs steadily climb.

Non-procedural languages and

system building by end users may well be the answer in the long term. To make an immediate impact; at least on the programming backlog, there is an alternative strategy: send the work to where costs are substantially lower and quality people are available.

In several Third World

In several Third World countries where labour costs are a quarter European rates, there is a quarter European rates, there is a substantial pool of under-employed university graduates. The idea is not new. Large

or how to slash people costs whime data preparation jobs have been exported to such countries as Taiwan and the Philippines for

been the co-operation between Burroughs and Tata, India's largest industrial firm, which now has a substantial software sub-

sidiary.

Not all programming projects are suited to being handled in this way. The criteria for program coding to be handled remotely must

The system design and specifications must have been fully wildsted and approved by user magement. Interaction should not be necessary between end user and program coder, as this is dearly not practical.

• The program structure, design and specifications must be rigothere should be no scope for imagination or initiative on the part of he program coder.

• The strategy for program and system testing must be clearly laid out, and carefully designed test

data supplied.

These principles imply a clear separation of design (the architect's role) from coding (the task of the construction worker). They imply strandard measurement are imply standard management ap-proval stages and quality control. They certainly imply a clear analysis and design methodology, With good documentation stan-

The objective of these criteria is in minimise communication between the design team and the conattaction team. But even with the test methodologies and diagram-matic techniques no specification can be proved to be watertight. show for one of the head designers to spend some time with the coding team, ensuring that there is no

Programmer's monthly
wage
Computer installations
Software houses
Computer bureaux
Availability of staff

lcome tax on foreign investors

Figure 2. Factors in establishing a software factory.

Major foreign

ganise the sharing of the work between the members of the team.

London or some other convenient centre?

Computing in the Third World. This Seecheck installation is at Petroleum Development (Oman) Ltd in Muscat.

Similarly, once the system is sults specified with the supplied test data, the project budget should allow for at least the coding team leader to install the new system in the user environment and to be present during user

acceptance testing and performance evaluation.
This inevitable overhead in terms of travel and communication costs means that there is a minimum size of project which can be If a long-term view is being taken, does the country have a stable govhandled in this way. I have found that on the basis of the costs in India detailed in Figure 1 and assuming comparable in-house costs of \$130 per day, the minimum size riddled with bureaucracy, corrupsuming comparable in-house costs of \$130 per day, the minimum size of a project is of the order of six

The selection criteria for a remote software development loca-

I. The availability of program-ming staff. Is there a pool of exper-ienced programmers or graduates of a high standard, as would be expected in a major commerical city with one or more leading uni-versities or technological insti-

2. The availability of compatible hardware. Are there computer centres or installations with time to centres or installations with time to obtain employment matching their spare, running an operational environment (such as operating notes). Note that in establishing a softsystem, DBMS, TP monitor) iden-tical with that under which the

tical with that under which the new application will run?

3. Communications facilities with Europe. Are telephone, telex and telefax lines and equipment available, and if so are communications to good or are there endless delays in its making a connection?

firstion. This is best done after the coders have had a few weeks to study the specifications and to or.

4. Travel connections with Europe participating in foreign programming projects. For example, one of tional airport nearby with frequent, reliable direct flights to the largest software houses and

8 years

Rritish &

MALAYSIA PHILIPPINES

\$450 415

10 years

American

A comparison of four low-cost countries

\$225 900

Rood

7.5%

5 years

British & Russian

computer bureaux in Manila (with some 300 staff), is keen to participate 'in software product development, offering to share the investment by undertaking the coding and testing at no cost in a 70% subsidy on fees paid for a 70% subsidy on fees paid for

coding and testing at no cost in return for a royalty on eventual

sales. Another is able to undertake

programming projects at a fixed

facilities. Is the location geared to multinational companies with adequate office accommodation, banking, electricity supply, water

personal accommodation. shopping, recreation, or will there be difficulty in attracting staff, particularly management staff, 7. Political stability and maturity.

tion and hostility?

Among the countries worth considering are India, Sri Lanka, Malaysia, Thailand, the Philippines, Taiwan and South Korea, Figure 2 Singapore is not included;

labour costs are already too high.

The availability of experienced
DP professionals is highest in india. India and Sri Lanka both produce large numbers of grad-ustes, who do not find it easy to

ware factory where the emphasis is to be on coding and certainly not imaginative design, it may well be best to train recent graduates around the methodology and stan-dards to be used, rather than attempting to retrain more experienced programmers.

It was in the Philippines that I

SRI LANKA

need training

25 years

Allowance Medical Travel Allowance Retiremt. Fund Training Overheads (shared between 30 Admin. Staff Accommodation Total Annual Cost per \$8,870 Programmer Daily Cost

foreign subsidiary. Most have a duty-free zone where industries can be established; all necessary orted free of tax; modern accommodation and services supplied; and where, in theory at least, red tape is cut to a

one of the longest established. (Figure 1 assumes use of SEEPZ facilities). Other zones include Bataan in the Philippines and a newer site near Colombo in Sri Lanka.

Ian Palmer is an independent consulprice, but this is based on costings
of less than \$70 per day.

A bonus is provided by the gov
Most other countries have a zero
or very low corporate tax rate for the early years in the life of a series, now available in book form.

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It is unit-compatible with the 5251 Model 11 and can therefore be intermixed with existing IBM screens.

The 2051 is priced at 51 410 features.

and System/38 CPUs.
The 2051, the first Memorex product developed specifically for this fast-growing market, attaches directly to the CPUs or through the IBM 5251 Model 12 Remote

a single unit, a saving of about 15% compared to the IBM 5251. Volume deliveries start in April.
Memorex UK (CW), Memorex
House, 96-104 Church Street,
Staines, Middlesex TW18 4XU.

Tel. Staines 51488.

its ergonomic design, including a desk-top display unit which is adjustable for position, viewing distance, screen angle and tilt.

"Users who spend prolonged periods at a screen have long been periods." neglected", said marketing director David Lade. "We believe manufacturers must provide a full range of adjustments for operator comfort."

Ompliter

The workstation has an enlarged display screen with a 19in tube.

or graphics application needs.

operator in mind A GRAPHICS workstation, the 2019W is announced by Westward Micro Systems, UK computer The anti-reflective green phosphor tube with bonded face plate combined with advanced raster techgraphics manufacturing specialists, which has set up its own in-house marketing department selling direct to systems houses and end-users. Previously in the service of the

it has sold through a distributor.

Designed and manufactured to suit a wide range of users and environments, the 2019W is a workstafreedom, says Lade. Software compatible with the Tektronix 4014 terminal, the 2019W gives a 1024 x 784 pixel tion aimed at sophisticated CAD resolution and can be used with Gino, Plot 10 and many other

Graphics station

designed with the

A major feature of the 2019W is proprietary software packages.
Options include plain paper or electrostatic copiers, a graphics tablet and four-page VDU buffer allowing high speed scrolling and display "window" for easy text/ graphics integration.

The 2019W is priced at under

> Westward Micro Systems (CW), Alexandra Way, Ashchurch Industrial Estate, Tew-kesbury, Gloucestershire GL20 8NB. Tel.: (0684) 298600.

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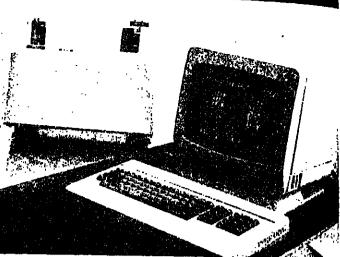
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Position in Company

Home computing



The Ferranti Chinese text processor including VDU keyboard and printer,

Chinese text system

A CHINESE processing system, which enables the user to input and process Chinese text using a keyboard and a visual display unit has been developed by Ferranti Computer Systems. The processor incorporates a

standard qwerty keyboard with two extra function pads of 8 and 12 keys respectively, inscribed with Chinese characters. These keys give the computer commands such as new paragraph, editing instruc-tions, memories and print.

Text is input via the compute The software helps the operator to select the correct character from a dictionary of over 8,000, and this

becomes the next "word" on the

page. The text is stored on floppy disc.

Ferranti Computer Systems (CW), Wythenshawe Division, Simonsway, Wythenshawe, Man-chester M22 5LA. Tel: 061-499

Low-price printer

priced daisy wheel printer on the UK market has been announced by Datarite Terminals. With prices starting at £475, the T/-Printer 35 can also be used as a self-correcting electronic type-

vriter.

Based on the Olivetti Praxis 3. Based on the Olivetti Praxis 35 portable electronic typewriter, the T/Printer 35 is supplied with its own ABS-moulded carrying case and weighs 17lbs. It takes up to 12in wide paper and uses standard Olivetti 100 character typewheels. These include a number of characters not usually found on computer printers, such as numerical fractions. The T/Printer 35 can be set for 10, 12 or 15 characters per inch a feature normally associated - a feature normally associated with more expensive computer

printers and typewriters,
Operating speed under computer control is about 120 words per minute — and completely error-

free.
The T/Printer 35 is available with Centronics parallel interface at £475, or with RS-232C serial

Datarite Terminals (CW), Caldare House, 144-146 High Road, Chadwell Heath, Essex RM6 6NT. Telephone 01-590 1155.

Desk-top plotters

DRAFTING quality, space saving and economic pricing are just some of the features claimed for the CPS-16 and CPS-30 Complet

desk-top plotters.

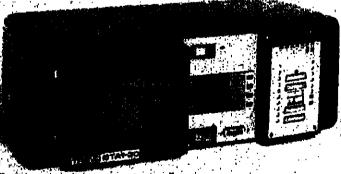
The CPS-16 has a 22in plotting surface, plotting speeds of 10 ips or 15 ips, and four microprocessor controlled pens allowing varied pen width or four colour drawings

on paper, Mylar or Vellum. The microprocessor-based controller accepts data from RS 232-C level or 20mA current loop source and provides for automati detection and rejection of transmission errors, local generation of alphanumeric characters, circular buffer memory and greatly re-duced CPU time. The CPS-16 features illumi-

nated touch control of the pen up/ down function, front panel selection of local or remote opera selection of local or remote opera-tion, paper and pen positioning via the jog and slew control, and scal-ing in both X and Y indepen-dently.

The CPS-30, a 22in plotter, offers four different intelligence configurations and five different interface capabilities.

Sintrom Electronics (CW), 14 Arkwright Road, Reading, Berks Tel: (0734) 85464



The Trend DTA 1-30 data transmission analyses.

Trend in data transmission

TREND Communications, the data communications division of Phicom, has developed a Insimulation mode, the DTA! microprocessor-controlled data transmission analyser, the Trend DTA 1-30, to meet the needs of manufacturers and users of data communications equipment, of engineers for in-situ fault diagnosis, and of programmers for software delivers. debugging and performance.

snalysis.
The portable DTA 1-30 is a bit, block, character and message error rate tester which can be connected as a line monitor of as a high per-

In simulation mode, the DTA 1-30 will analyse a data channel in terms of signal distortion and error rate. Tests may be performed in simplex, half duplex and full du-plex modes using internal or user

entered test data or messages.

In monitor mode, half or full duplex data can be displayed on the 7in CRT screen in real ime. Trend Communications (CW), Knaves Beech Estate, Loudws-ter, High Wycombe, Bucks HP10 9QZ, Telephone: (06285) 24977.

Data General adds four peripherals to commercial family

DATA General has added four peripherals new to the commercial system (CS) computer family.

Kbytes per second. It is supported by CS interactive Cobol and CS Business Basic. They are a printer, magnetic tape drive, and two Winchester disc

logic-seeking, bi-directional abletop model. It features a 9 × 9 tinue the company's practice of clongated, and compressed-elongated); four-million-impression ribbon cartridge; and self-test capability. The printer has eight switch-selectable resident lan-

able on the commercial systems configurations, thus allowing having a memory of 64 Kbytes and the latter 128 Kbytes). Featuring IBM and Ansi compatible was former if has a recording. tible tape format it has a recording density of 1600 bpi with a storage capacity of up to 27.3 Mbytes per reel and a data transfer rate to 48

Tel: 01-572 7455.

Business Basic.

As a physical image back-up system, the drive is claimed to be

62.5% faster and to store up to 26.1 Mbytes more (a 2,000% inoutrolled high-speed printer is a crease) than diskette back-up

The new Winchester discs for dot matrix print format, four prin- the CS/50 and CS/70 systems con-

ganges. single-board controller that sim-The Magnetic Tape Drive plifies maintenance and increases Model 6123 is a back-up device to configuration flexibility. The two the 12.5 and 25 Mbyte discs avail- discs provide 36 new CS packaged

Drum memory 'faster than a Winchester'

A MOVING head drum memory, which is claimed to beat a Winthester on access speed and throughput and which is smaller and less expensive than comparable fixed head devices, is available from Vermont Research.

Designated the Vermont 6064, the 10.2 Mbyte moving head memory is designed to withstand stock, vibration, temperature ex-temes and particle contamination. Although developed primarily for Vermont's traditional drum

mėmory markets — telecommuni cations, process control and scienafic research - the company sees atial in other industrial areas. drives, especially in adverse

working environments.
Costing about £3,000, the memory logically incorporates 78 cylinders, each with 131 Kbytes capacity, and 16 moving heads, compared with two, four or possibly six heads on competitive de-

It has a track switch time of 10us, and single cylinder seek time of 8.3 milliseconds.

The unit is no bigger than two eight-inch floppy disc drives. Vermont Research (CW), Cleeve Road, Leatherhead, Sur-rey. Tel: (0372) 376221.



Sharp MZ-80K fitted with Datron's Triple-Vision

Sharp Triple-Vision AMULTI-screen microcomputer diplay system has been introduced by Datron Micro Centre for sound and vision on up to 12 moni-

models are available. Triple-Vision provides output to a standard UHF TV or projection TV, plus up to 12 monitors with sound

the Sharp range of personal computers.

Sound and vision on up to be stock laker in the stock laker in the warehouse or retail store facilities. Multi-Vision or Triple-facilities. Multi-Vision or Sharp counting the stock he records decounting the stock he records decounting the stock has price on Por the Sharp MZ-80K and MZ-80B, two monochrome dealers at £35 and £79 respectively.

vely; fitting extra.

Datron Micro Centre (CW), 2
Abbeydale Road, Sheffield S7
1FD, Tel: (0742) 585490.

Debt control system

OLIVETTI has extended its range of business computers with the introduction of the BCS 2099, devisated to help users exert tight which of overdue debts.

The BCS 2099 is a desktop which is open to several different computer languages. The which is open to several different computer languages. The which is open to several different computer languages. The whom it offers control of credit and control of the company's own expenditure.

The system is simed at first-time computer users and small firms, to whom it offers control of credit and control of the company's own expenditure.

British Olivetti (CW), 86-88 Upper Richmond Road, London SW15 2UR. Tel: 01-785 6666.



Mass storage for the DEC VT103

The Arrowpsk 525 overcomes a common objection to the VT103

- the current mass storage

systems available from DEC are

ARROW Computer Systems plans to market a complete integrated system comprising a DEC VT103 combined with the recently launched Arrowpak 525 mass storage system for LSI-11.

The Arrowpak 525 provides the VT103 with up to 12.6 Mbytes of formatted 54-inch Winchester storage (256 byte sectors) plus up to a further one Mbyte on 51/4-inch

too large for many applications.

The Arrowpak 525 is styled for desk-top use and measures 40x40x10 cms. The unit is AC powered and a single ribbon cable links it to the DEC VT 103.

Lower capacity versions are available, the complete unfor-

matted capacity range being four, eight, 12 and 16 Mbytes on the Winchester and 250K, 500K or

one Mbyte on the floppy.

This latest offering from Arrow will provide a complete computer system with mass storage at prices starting under £4,000.

Arrow Computer Systems (CW), Rosemount Tower, Stafford Road, Wallington, Surrey SM6 8RW. Tel: 01-647 0962.

Controller for Philips processor

AS PART of the development of ts office automation plans, Philips Business Systems has made available a multi-line asynchronous (MLA) communications controller for its P7000 distributed proces-

The MLA offers users microprocessor-driven controller capable of supporting up to 16 asynchronous lines. Together with the necessary protocols and device-handling commands in the P7000's Vision language, the MLA allows integration of devices such as barcode or OCR readers with convenional keyboard data capture at the

P7000 workstations.
It also provides asynchronous interfaces with completely separate terminals, handprint devices, erfaces or factory data collection

Single line asynchronous communications are already used on the P7000 Datahost system where it interfaces with telephone charge monitoring equipment in severa international hotels.

Philips Business Systems (CW), Elektra House, Bergholt Road, Colchester, Essex. Tel: (0206) 575115.

Dual density plotting for fast graphics output

VERSATEC has launched the Model 530 raster data translater Model 530 raster data translater which gives the standard 200 dot per inch user the option of 100 dots per inch dual plotting capability on the Versatec plotter range.

A large number of design and drawing applications require the facility for fast "quick look" out-

put during the design process, says Versatec. The Model 530 will produce check plots and screen dumps quickly, the company claims, and then allow the same Versatec printer plotter to produce high resolution plots of 200 dots per inch for finished output. The Model 530 is considered

useful in CAD/CAM, remote plot-ting, hard copy, and seismic and mapping applications because the use of its 100 dots per inch reduces the raster data transfer burden by 75% and at the same time signifi-

quarters with the straight raster data, and by significantly more when Versatee's compressed raster data format is used.

cantly reduces host computer rasterisation, says Versatec.
Remote plotting users, using the

Versatec (CW), 27-35 London
Road, Newbury, Berkshire. Tel:
(0635) 42421.

Portable stocktake system

A WHOLESALE/retail stocktak-ing package, based on hand-held microcomputer terminals has been introduced by MSI. MSI's terminal system captures

information during physical stocktake and produces an evalua-tion of the stock on site.

tion of the stock on site.

Benefits claimed by MSI for the system are that information regarding the value of stock is immediately available to the stocktaker and can be checked against theoretical stock values be-fore other stock movements and

Also, the data preparation cost involved in recording stocktake

partments, quantity and price on the hand-held terminal's key-

The terminal calculates the quantity times unit price and stores the information against the appropriate departmental total.

The stocktaking routine can be undertaken in a strict department sequence or alternatively in random department sequence.

Stocktake data is stored in the terminal's solid state memory which can be reviewed using the terminal display and may be mod-ified if required.

ified if required.

The cost of the terminal system is in the range £800 to £1,300 per unit, depending on memory size. MSI Data International (CW), IVC Building, 10 Portman Road, Reading, Borks. Tel: Reading

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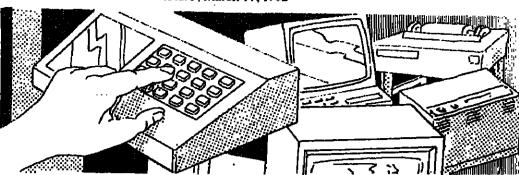
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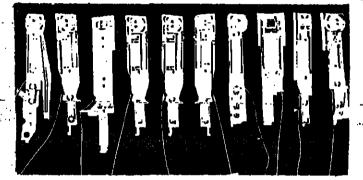
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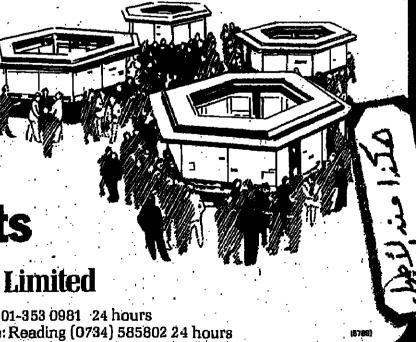
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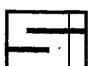
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On behalf of an expanding Systems Supplier and Consultancy we are seeking a number of Software Programmers and Applications Engineers. Of particular interest will be those who have participated in the development of a PDP II or VAX based real-time system or alternatively, have gained experience of simulation systems utilising any 32-bit minicomputer. Software expertise should in-

VAX Progs./Designers

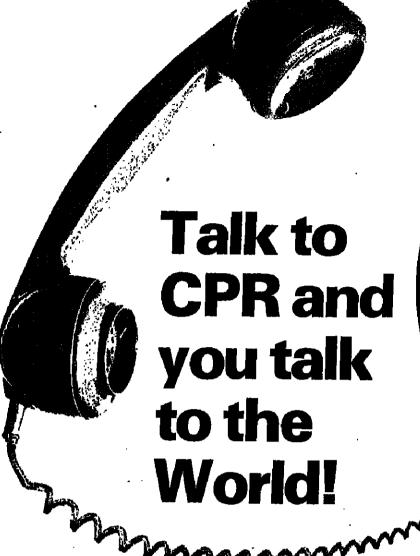
London & E.E.C.: Salaries to £15k

A leading International Systems Company apecialising in the development and sale of communications software is seeking Programmers and Designers for its Central London and overseas facilities. Sultable candidates should hold a numerate degree and have two years' subsequent programming or systems design involvement. Fluency in FORTRAN is essential and it is preferable to

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(8779)

COMPUTER WEEKLY, March 11, 1982



If you are an experienced computer professional seeking employment at home or overseas on a contract or permanent basis - you need very special advice and guidance from people who will look after you and point you in the right direction.

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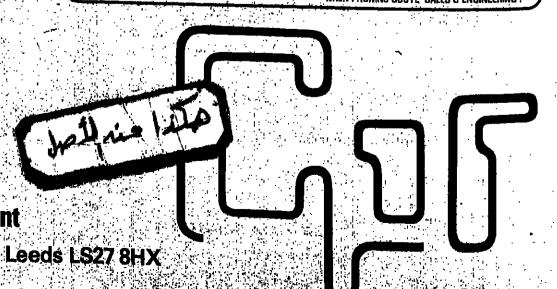
South Coast N. Wast London	NSTALLATIO IBM Programmers COBOL Programmers Systems Eng. RSX 11M Programmers COBOL Programmers COBOL	to £9,000 to £7,800 to £12,500 to £10,600 +benefits	kelend N. West S. Coasi	Consultents Systems Analysis Systems Engineers	to £11,00 + Car benefi to £12,00 to £12,00
S. Yorkshira N. Yorkshira	Systems Eng. Fortren, Coral Programmers DEC Programmers IBM, ICL Systems Analyst IBM ICL	to £8,500 to £9,500 to £8,000 to £11,000 to £12,000	Lincolnshire E. Midlands W. Yorkshire WHEN PHONI	Analyst ICL Programmers RPG II Analyst/Progs. RPG II NG QUOTE 'USERS'	+ benefi to £10,00 to £9,50 to £8,00

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Telephone: Radlett (09276) 3077

N. Hampshire IBM Software Design £10,000-£16,000

These are unparalleled opportunities to design and develop a brand new CICS TP system with an international and highly respected consultancy. Clearly, this project will provide amazing and much sought after experience to those lucky enough to acquire a place on the team. In addition to this, and the excellent salary, the employment package includes a bonus scheme, pension scheme. free private health care, free life assurance, a discount stock purchase plan and opportunities for extensive travel. In return, the company expect a high level of commitment and a desire to extend your knowledge in database and teleprocessing technology. The essential skills are as follows:-

CICS System Designers Required is a deep experience of systems design and a thorough understanding of CICS plus total fluency in Assembler. The responsibility will be for

CICS Programmers A significant track record of programming in Assembler and a good knowledge of CICS. The responsibilities will be to produce high quality results to agreed schedules in a development environment.

Systems Programmer Amongst other duties, this person will be responsible for setting up and supporting a 4300 system which will be used as a development machine running both DOS and OS under YM. Applicants must be fluent in Assembler and CICS and also fully experienced in all aspects of systems development. A real challenge.

ATE Software Design

to£10k

At the heart of any modern automatic test system is a creatively designed software package and, to enable our client to maintain its position at the top of the ATE league, further innovative software designers are required to work on exciting new projects. Facilities and prospects are excellent, as is the location of this forward looking and dynamic company.

The future is there, do you have the necessary past? The requirements are: a degree level education and at least 2 years experience in real time programming, or software design, preferably in a scientific or engineering discipline. Current ATE software designers will of course be looked upon with favour.

Contact: Dennis Meiling

Technical Author (French speaking)

A world famous manufacturer of computers and computer systems, requires an experienced Technical Author at its Paris facility to work on varied and interesting projects. The successful candidate must have English as the mother tongue, have a good grasp of the French language and be technically conversant with micro/mini computer systems. Additionally, some experience of the following: the use of the Z80, CPM, BASIC, BAL, FORTRAN and/or COBOL would be desirable. Contact: Dennis Melling

Recruitment Consultants

We are still looking for personable, business-minded applicants in their mid-twenties who are interested in joining our committed and successful team when we move to our larger offices in Dunstable.

If the advertised positions do not match your experience or aspirations, the Modus Consultants are always available for a confidential discussion of other vacancies available. An informal meeting - often an essential part of the process - can be quickly arranged.

Package 17-22K **SWITZERLAND**

We are seeking a number of candidates to expand our team working in SWITZERLAND on one of the worlds most advanced Integrated Digital Communications Systems.

All candidates shall have a proficient knowledge of GERMAN and shall have had experience in one or more of the following areas.

- * DATABASE DESIGN
- * MAN MACHINE INTERFACING
- * VERIFICATION AND REVIEW OF DESIGN
- **DOCUMENTATION**
- REAL TIME DEVELOPMENT
- PROCESS CONTROL

UNITED KINGDOM Package to 15K

We are also seeking candidates who will be prepared to relocate within the U.K. It is essential that candidates shall have a minimum of three years experience with a good knowledge of FERRANTI IN CORAL.

For further information phone 01-530 3186 or write with C.V. to the address below:

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CAREER DEVELOPMENT

drive and determination and a strong commitment to living abroad are equally recruits have already made significant

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Client representatives will be conducting interviews in Nantwich or 25th March and in London or 25th March.
For an initial discussion, ring ms. Naville John, on (0270) 827206 client times, or write to ms at the address below.

OCC Computer Personnel 5 Hospital St. Nantwich, Chesh Tel. 0270 627 206

and international computer and technical appointments.

Systems Support Specialist

(Mini-Computer and Office Automation)

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TO£12K+CAR

Our client is one of the most established and successful mini-computer manufacturing companies in the world. With one of the widest product ranges in the industry, they geared themselves in 1981 to enter the office automation market and are now marketing systems incorporating micros, word processing, electronic mail and integrated distributed processing based on local networks, together with their range of mini-computers including 32 bit machines.

We are seeking to recruit a SYSTEMS SUPPORT SPECIALIST who will be part of a team providing support to both existing customers and to a technically competent sales force. This is a senior position and requires technical competence, business acumen and the ability to supervise the work of others. The basic requirements are as follows:

- At least three years' experience as a systems engineer working with one of the major manufacturing companies equipment, e.g., DEC, Prime, Data General or Hewlett Packard.
- Commercial awareness the ability to work closely with salesmen.
- The ability to supervise the work of systems engineers.
- A desire to increase skills into office automation and distributed processing systems.

In return for these skills the company offers substantive large company benefits. Complete training will be given on the product range and the car scheme provides flexibility in choice of vehicle. For further information contact Kevin McCourt quoting Ref: 6017.



123, New Bond Street, London WTY OHR 01-499 7761

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CALMA is a world leader in the design and manufacture of Computer Systems for Design

Featuring powerful Interactive Graphics, and Design software, CALMA's fully integrated systems are used for integrated Circuit and Printed Circuit Board design, in Cartography for general purpose and utility mapping applications, and in a broad spectrum of 3D mechanics and process plant industries for CAD/CAM applications.

CALMA is a wholly-owned subsidiary of General Electric (U.S.A.) which, as the world's largest electronics company is totally committed to maintaining CALMA's leadership. As a direct result of this commitment, additional staff are now required at CALMA's European Headquarters in Camberley.

RESEARCH AND DEVELOPMENT

A new European Software Research and Development Department is being set up in initial emphasis will be placed on Microelectronics.

The main qualifications for all these positions are an HND or Degree in Electronics/Electrical Engineering, Physics or Computer Science:

A minimum of two years' relevant experience is required for the SOFTWARE ENGINEER vacancies and 5 years' for the SENIOR SOFTWARE ENGINEER vacancy. The Design Tools will be implemented in PASCAL on a VAX.

Experience of CAD-type programming, IC layout Electrical logical design will be valuable. Salaries will be in the range of £9,000 to £12,000, depending on age and experience. ng for the above positions please quote Ref. PMD at the top of the letter.

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The Training Department has vacancles for instructors to train our oustomers in the use of the Machanical Design and Architectural Engineering and Construction software. The successful candidates are likely to have specialised in mechanical or civil engineering, have some computing experience, and be fivent in German and/or French. Experience of teaching adult students would be an esset. Salary will be in the region of £9,000 dependent upon experience.

Please write in first instance quoting Ref: NCB.

Benefits for all the above positions include a company pension scheme, BUPA, life



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Our client is the leading European company in the design and manufacture of advanced Automatic Test Systems for the electronics and engineering industries. Being a highly successful part of a large international group, they are able to offer genuine career advancement together with the challenge of innovative software design in the forefront of technology. They are currently offering career opportunities for

Senior Software Engineers

with management potential. Ideally you will be qualified to degree level with a minimum of two years' experience in high level scientific or systems programming within a Real Time environment. You may also have some experience in the development of operating systems in the engineering or scientific

With further expansion and new generations of innovative products planned, the projects will involve stimulating work on: automatic programme generation; high level compilers; advanced structural development; sophisticated debugging packages. The company atmosphere is dynamic with a keen interest in the development of their employees. The benefits package includes a generous profit sharing scheme, 24 days holiday, free life assurance, pension scheme and an excellent relocation package to a pleasant part of the South West with exceptional education, social and leisure facilities.

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PROGRAMMER **PROGRAMMER ANALYST/PROGRAMMER**

SYSTEMS PROGRAMMER

IBM DOS-COBOL + ADABAS IBM DOS PL/1 + ADABAS
IBM DOS COBOL DL/1 CICS IBM DOS VM COBOL VSAM CICS IBM DOS COBOL IBM OS COBOL (RAMIS) CICS IBM MVS COBOL DL/1
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PROGRAMMER ANALYST/PROGRAMMERS ANALYST/PROGRAMMERS SYSTEMS DESIGNER

OTHERS

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DATABASE DESIGNER PROGRAMMERS PROGRAMMERS ANALYST/PROGRAMMERS **PROGRAMMERS** ANALYST/PROGRAMMERS ANALYST/PROGRAMMERS PROGRAMMERS ANALYST/PROGRAMMERS ANALYST/PROGRAMMERS ANALYST/PROGRAMMERS

ANALYSTS

IBM + BANKING EXPERIENCE IBM + ADABAS MATERIAL CONTROL VAX SALES ORDER PROCESSING ICL + FOREIGN EXCHANGE

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ANALYST/PROGRAMMERS

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Computer Search Contracts

I.B.M. Shift Managers Saudi Arabia £19,200 to £23,600 net

On behalf of a major Client, Comcap Resources Limited has played a key role in recruiting high calibre Operations Personnel for one of the world's most ambitious computerisation projects.

We have now been instructed to urgently select three Shift Managers, who will play an important role in our Client's future development plans.

To be considered for these once in a lifetime opportunities, you will currently be working in a large IBM multi mainframe environment running under MVS.

The successful candidates will be offered indefinite term contracts, initially on single status and a first class benefits package.

Such is the urgency of this assignment, our office will be open all weekend, March 13th and 14th.

Suitable applicants may call in anytime between 9 am and 6 pm or ...

Phone Mike Mannion today 01-723 4053



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THE The Computer Manager, who will report to the Head of POSITIONS: Clearing will be responsible for the introduction of all ... aspects of computer systems and the running of the data processing function, once it becomes operational in 1983.

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Simeulation Systems

c £13,500 plus quality car

Our Client is a multi-national Organisation with extensive experience in computing and holds the exclusive Europe-wide franchise for the AD 10 simulation computers of Applied Dynamics International of Michigan, U.S.A.

As a result of considerable expansion in the U.K., our Client now requires additional Support Engineers with experience of interactive simulation processes to provide professional support to a wide range of large AD 10 Users.

Applicants should hold at least an HNC or preferably a Degree in either Mathematics or Physics and have experience of high speed computers working in parallel in, perhaps, weapons research, finite element, flight path or atom splitting simulation. A knowledge of software is required and a DEC/FORTRAN background would be ideal in that the AD 10 interfaces with the DEC

A highly professional attitude is necessary as the Support Engineer will interface with Clients at a Senior level. The position will carry a certain amount of foreign travel although Support Engineers will work largely from home.

Full product training is available and will be carried out at ADI's fiead Office in Michigan, U.S.A. Starting salaries will be negotiated in the region of £13,500 per annum and other benefits include the full use of a Volkswagen Passat Estate car, free BUPA and a contributory pension scheme with free life assurance.

Interested applicants should contact Ian Payne on 021-236 8781 (24 hour answering service) or alternatively forward a concise CV to him at the Birmingham address. Initial interviews will be carried out at your nearest SCR regional office before the end of March.



Specialist Computer Recruitment Ltd 35-37 Great Charles Street, Queensway, Birmingham B3 3JY 021-236 3781 Birmingham e London e Manchester e Brussels e Amsterdam

PERMANENT *APPOINTMENTS*

MCRIVRX Operator, S.E. London, £6k IBM Sys. 38 Operator, N. Surrey up to £6k Operations Lecturer, C. London, £10+

For further details of the above requirements ring Keith on 01-836 8411

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IBM System 3 Operator, W. London, to £9k. Are you young with approximately I year's IBM System 3 Model 15 operating experience and have a strong desire to join a small but professional Operations team? Our client can offer you the excellent working environment 2-ship, working plus the availability of usual banking benefits. Ref. KS503/CW

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CONTRACT REQUIREMENTS

Call Liz pri 01-826 8011 for the above contract



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On the banks of the River Avon at Malmesbury in Wiltshire, Philips Telecommunications has one of its four European development centres working on the PRX range of computer controlled digital public telephone

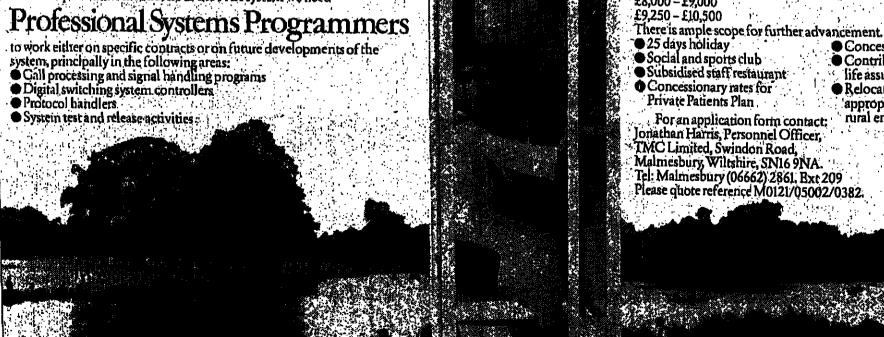
The PRX system has been chosen by a number of PTT's throughout the world including Saudi Arabia, where in a continuing contract Philips has helped to produce one of the most modern telephone networks in the world.

At Malmesbury the hardware and software for contracts such as Saudi Arabia is developed in conjunction with our other European development.

To help continue the success of the PRX system we need

Telecommunications

- System test and release activities



Languages used are CHILL (a C.C.I.T.T. language similar to ADA) and Zilog Assembler,

You will be expected to participate in group meetings at our other development centres in Holland, Austria and Belgium.

Applicants should have a degree in either Computer Science or other discipline with a strong computing content, together with 2-5 years programming and software design experience in scientific or process control systems, microprocessors or telecommunications.

Initial salaries, depending on experience, in the ranges: £8,000 - £9,000

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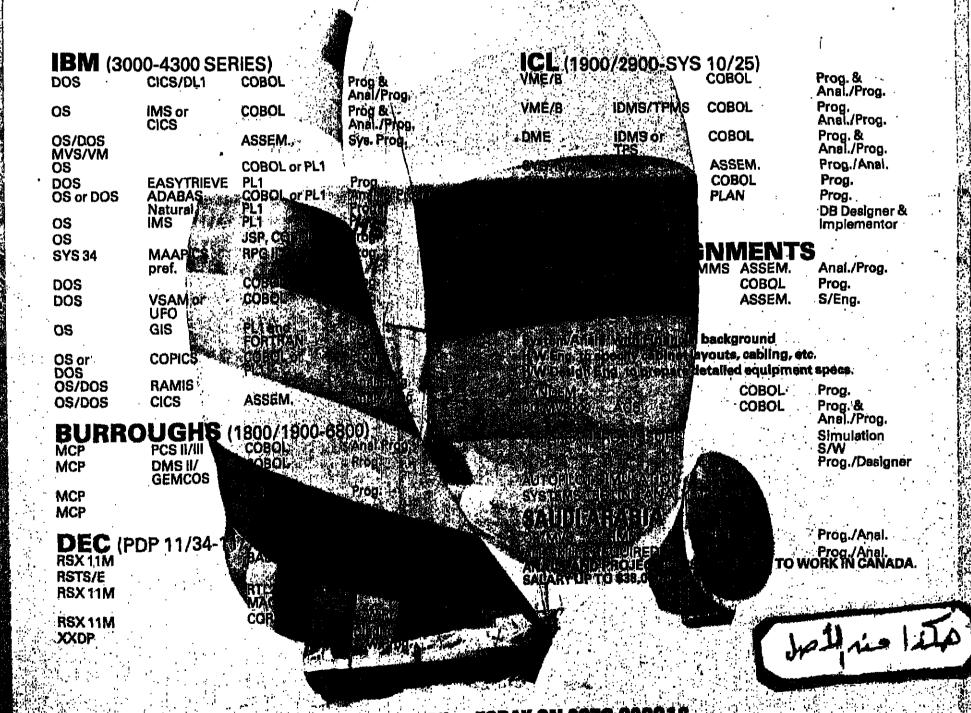
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Our client is introducing a new high-level language for large scale Software productions. An additional programmer is required to develop Software tools, debugging systems and

some med and a statement of the entry of the

Successful candidates should have a degree in Computer Science. 2 years' of IBM or UNIVAC, used modern high-level language and have been involved with large Software

SATELLITE COMMINICATIONS PROFORDSHIPS

A Software engineer is required by our client to join a small team developing this new and very exciting area of communications. Candidates should be in their mid to late 20s, a background degree in electronics or related subject, 2 years' experience of assembler plus a high-level language and ideally a mixture of PDP11 and INTEL experience.

SCIENTIFIC PROGRAMMAERS LONDON

An expanding division of a well-known Software House have immediate openings for the following projects:

Real Time Simulation Process Control, CAD Commercial + Control and Mathematical Modelling, Successful candidates should have one or more of the following: Minimum 2 years' Software Programming, PDP11, RSX11M, VAX 780, ASSEMBLER, CORAL 66, RTL2

SWITZERLAND

GERMAN-SPEAKING SOFTWARE ENGINEERS

A major communications company require additional German-speaking programmers, to develop new communications Software. Candidates should have a minimum of 2 years' Real Time experience in this field.

HARDWARE ENGINEER BEDFORDSHIRE

Satellite communications is our client's speciality. They currently wish to employ a Hardware Engineer with a minimum of 3 years' experience in industry. A degree background is necessary plus some involvement in Software Hardware experience of PTL and ECL design on micros would be ideal.

ASHFORD SOFTWARE ENGINEERS

A company dedicated to Communications Systems is currently seeking engineers with a variety of the following:

- IBM/ICL PROTOCOLS
 - DEC/RSV11/VAX DEFENCE
- PROCESS CONTROL

FRANCE IBM SYSTEM PROGRAMMERS

One of France's largest Computer Services Companies have openings for IBM Systems Programmers to work on a variety of our client's installations in a Systems engineering

Knowledge of French would be helpful, though a willingness to learn French is essential. Technical experience must include a minimum of 2 years' MVS experience plus related Software Tools.

OPERATIONS RESEARCH PROGRAMMER/ANALYST

Our client's London-based operational Research/Scientific Systems group is currently seeking programmers with the following expertise:

- Honours Degree
 Financial Planning

REAL TIME SOFTWARE SPECIALIST SURREY

We are seeking applicants with several years' experience of Software Design. An implementation of Real Time processing, ideally candidates will have experience of Field Support, Radar Systems RSX11, RTL2, Degree and high- and low-level languages.

MIDDLESEX SOFTWARE DESIGNERS

An expanding division of a Software Engineering Company specialising in mini- and midro-based systems require additional designers. The company is developing several new projects in the Scientific and Engineering field and have exciting opportunities to offer Candidates with at least 5 years' experience in one of the following areas: Process Control, Defence Systems, Communications, PDR11, INTEL

COMMAND & CONTROL LONDON

One of the largest international Software houses with their headquarters in London have a requirement for Software Designers with a minimum of 1 year's experience in Real Time Systems Design, candidates should have a degree plus experience in one or more of the

- Defence Systems
- All the above appointments involve permanent positions and carry a wide range of salary and conditions dependent on location and experience. In the first instance please send up a copy of your CV (alternatively telephone for an application form) so we may discus your application in confidence with our client on your behalf.

01-399 9183

Detamatics Freepost, Surbiton, Sujrev Kt6 58R



SPECIAL FEATURE

OPPORTUNITIES IN SALES & MARKETING March 25 issue

If you are looking for professional Sales and Marketing people, then Computer Weekly is the journal you need, because Computer Weekly reaches more sales people than any other weekly computer journal.

The March 25 issue provides an added bonus with our special editorially supported feature, highlighting the career opportunities for sales professionals. This is just one of many career-linked features to be published during 1982 almed at helping readers improve their careers, and at the same time provide invaluable back-up for advertisers.

Whoever you are looking for Computer Weekly is your best communication link with skilled computer people. Analysts/Designers, Programmers, Operators, Sales Executives — we reach more than our nearest competitor. And it's best for those top jobs too with over. 32% of readers holding senior/managerial positions.

> To reserve space for the Sales & Marketing feature phone (01) 661 0121 today.

Copy deadline is Monday, March 22.

Classified Department, Quadrant House, The Quadrant, Sutton, Surrey SAI2 5AS.

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We have contract positions open with our clients now and additional people will be needed inroughout 1982. Contact us now to register.

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People with substantial experience as Business Analysts are required for the UK and Saudi Arabia. Applications include: Housing Management Systems, Transportation Systems and Material Supply Systems. Experience of both poten and on-line systems required.

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- * Hve-day working week * Overtime payments Regular return flights
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We olso have current requirements for parmonent staff to work in the Essex died:

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An interesting and unusually altractive opportunity has arisen a programmer with 12/18 experience on micro or mini based systems software. The successful candidate will be required to join a small team of specialists writing compilers and operating systems. Our client is a leading US company now exanding its UK operation Contact Tim Bridges.

Applications Support

H. Counties c. £11K + car

Two experienced support speci-alists are required for a very successful financial modelling and management information package running on S/34 and S/38. Candidates should have previous user support experi-ence, accounts knowledge and Interactive computing experience. Central London base but mostly working from home, you will need to be resourceful. Pre & post sales, installation and Contact Tim Bridges.

Support H/W Berks. c.£11K + car

The product range and repu-tation held by this client has made it a world leader in the highly competitive and expanding field of data communications. Candidates must have detailed technical knowledge of modems, multiplexors, data concentrators etc., plus a suitable client relation manner. Product training provided. An excellent opportunity for advancement. Contact Terry Harvey.

Tech. Micro **Application**

N. Bucks £8K to £11K

A small, high callbre development team working on the application of micro processors to ndustrial and scientific measure ment and instrumentation is seeking a software person with a good hardware understanding of architecture and machine interfaces. Experience with I.E.E.E. 488 interface, 8080/85 and Intel MDS 800 kit. plus programming in Assembler and PLM would be Contact Terry Harvey.

Networking X.25 L.A.N.

Beds/Herts. £10K-13K+ You will be an experienced data

comms. person, probably with a In more recent times you will have been involved in X25 projects and be up-to-date on recent developments in networking. Tasks vary from Internal consultancy to team leader responsibility for design and implementation. Positions are with expanding engineering development groups.
Contact Terry Harvey.

A last expanding computer man-ufacturer has an opening for an

analysi/programmer to work in its own internal DP department. Preference will be given to can-didates of graduate level with over one years experience preferably in Basic but training will be given where necessary. A current driving licence is essential for visiting different company Contact Tim Bridges.

Analyst

Programmer

Control Systems S/W

Our client specialises in com-puter controlled industrial appli-cations and mechanical handling processes using PDP 11, RSX 11 and Intel microprocessors. Projects are varied and interesting with limited site installation and testing. Candidates need to be self starters and experienced Assembler level programmers. This is a small, growing company with prospects for promo-ilon dependent on merit. Contact Terry Harvey.

DEC Project Managers

S. Beds

There are openings for two Pro-ject Managers in this expanding scientific development group. The client is a subsidiary of a large International manufacturer of scientific instruments. DEC/RSX-11 is used in a control and executive mode at the centre of complex computer and instrument systems. A scientific qualification with DEC and severe fication with DEC and supervisory experience would be at-Contact Terry Harvey.

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A major international bank operating twin IBM 4341s is seeking a Technical Analyst. The person appointed will be responsible for liaison between systems programmers and the operations department to ensure the smooth laterduction of new systems onto the bank's computers. Very thorough knowledge of DOS/VSE and CICS/VM needed. Low mortgage, free meals, season tkt loan etc. Contact Tim Bridges.

Write, or telephone us during affice hours as below.

Any other time call Terry Harvey on: Great Missenden (02406) 4705, Tim Bridges on: The Lee (024 020) 502. We are always ready to discuss these and many other interesting positions.

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In the last year we have installed a one megabyte ICL 2946 (DME/Exec 5S, 23 VTs and two linked

We are looking for someone with: management

We offer flexible working hours, 26 working days holiday, car loan facilities and, reduced rate membership of BUPA. Assistance with relocation expenses and housing may be available.

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Our client, a leading manufacturer of matrix, daisy wheel and band printers, seeks a sales executive to join their expanding and successful team. As it is the company's policy to promote to management level from within, the applicant should have the presence and determination to subsequently lead by example.

Although it is preferable that your experience has been gained within the computer industry, consideration will be given to those applicants with a proven record in business aquipment or office product sales.

For further information contact Brian Mawdsley quoting

Lloyd Chapman

ASSOCIATES
123, New Bond Street, London WIYOHR 01-499 7761

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Hications into existing . applications programmes, writing simple supplementary programmes, preparing check sequences or adapting them to the hardware possibilities as well as checking the execution results and

In both cases, the main qualifications are an education to 'O'/A' level standard or the equivalent work experience, at least three years' professional experience in one of the above mentioned fields and a knowledge of two programming languages - one of which should ideally be COBOL-ANS. The date of birth of all applicants must be after 31st December 1941.

December 1941.

The conditions of employment with the Community in Brussels.

A net monthly salary (after all deductions for social security, income tax etc.) of between BF 58,000 (around £708) and BF60,500 (around £765) - including an expatriation allowance.

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048, Brussela. The closing date for submission of the official application form is the 15th of April 1982

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Contact the Personnel Officer, Salisbury District Council, Bourne Hill, Salisbury, Wilts, SP1 3UZ (Telephone 0722 6272 Ext. 278) for an application form and further details. Closing date: 25th March, 1982. Interviews to be held on 29th March, 1982.

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BUSINESS SYSTEMS CONSULTANTS

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test communica, and David Lloyd UNIVERSAL CMS LTD. Victoria House, Albert Road Old Windsor, Berkshire, SL4 2PZ Tel: Windsor (07835) 84587

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Services Manager

on line systems. We also poll two shops where P.O.S. equipment is installed. We are looking for a high flying computer professional (male or female) who can have considerable impact on the running of our business. Knowledge of P.O.S. systems and communications is desirable as much development is planned in this area. Likely age range 25 - 35 years.

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Applications are invited from computer programmers/ analysts for a post of PROJECT ASSISTANT within the Clinical information Science group in the university department of Surgery (St. James's Hospital, Leeds) for work on a national Computer-Aided Diagnostic Project. The post is available immediately for a fixed term of up to three years with possible continuation thereafter. Applicants should have a dagree, preferably in computing or statistics.

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Informal enquiries may be made to Mr. F. T. de Dombal (0532-33144 ext. 5668).

Application forms and further particulars may be obtained from the Registrar, The University, Leeds LS2 9JT, quoting reference number 110/2. Closing date for applications 25th March, 1982.

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The candidate should ideally have a minimum of 5 years' DEC experience covering BASIC+2, RSTS/E and RMS-11. To be successful, your application skills should have covered SALES ORDER PROCESSING, STOCK/PRODUCTION CONTROL and MANAGEMENT ACCOUNTING.

This position carries a high percentage of on-site work so candidates must be prepared to travel.

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For more information, ring SHIRLEY-ARIN FRANCIS on 01-489 7761 during office hours or 01-542 2938 after 7 p.m.; quoting ref: 6012.

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Our Client, Interactive Database Systems Limited, is a small well established and extremely successful software consultancy specialising in the development and implementation of sophisticated packages for financial

Due to rapid business growth, they urgently seek two Analyst/Programmers to join their banking team. Specialising in the installation and support of the IBIS 38 System, custom designed for the IBM System 38 and currently the most advanced and comprehensive banking information system of its kind, ideally you will have:

- * A minimum of 2 yrs RPG II Exp.
- * Sound Knowledge of System 34/38.
- * Experience of financial/banking applications.
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This position entails overall technical responsibility as well as project and budgetary management functions. You will also have to ensure cross product integration and compatibility in a family of dictionary driven products. An effective communicator is essential to ensure ongoing user liaison.

If you have a proven track record in the management of IBM development projects and are strong enough to take on this significant level of responsibility please telephone either Jenny Dairympie-Hay or Roger Allington on 01-493 2947 during the day, or respectively Beaconsfield (04946) 4579, Little Gaddesden (044284) 3536 (evenings/weekends), quoting reference 9898.

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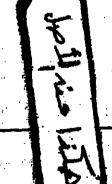
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The Data Communications Specialist will provide Technical Support to customers and colleagues mainly in a Post Sales environment (aithough some Pre-Sales work may be involved). Major areas of

Data Communications Software T.P. Monitor Software

- The successful applicant should have at least five years DP experience in a Technical environment with at least two years' experience of developing and supporting large Data Communications Networks. He or she should possess skills in some of the following Data Communications areas.
- Knowledge of Data Link Protocols
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 Understand the functions of Hardware Components
 Understand the functions of Hardware Components Use of Testing/Fault Finding equipment e.g

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TO £10K

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Experience in the design of screen based systems and a thorough understanding of file design is

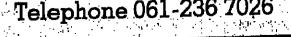
Technical Support experience and Operating Systems background on mini-computers required.

Experience in COBOL and/or ASSEMBLER.

In the first instance, applicants for all positions should contact JEFF WALTON on 061-236 7026 (daytime) or on 061-962 0002 (evenings and weekends).



Insight Marketing & Personnel Consultants Austin House, Charlotte St., Manchester 1 Telephone 061-236 7026





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Design Engineer

We are currently seeking a professionally qualified Design Engineer to work in a senior capacity for a prestigious communications manufacturer. Applicants must be capable of demonstrating their utilisation of both Analogue and Digital design techniques together with, ideally, a background in active-filter design. Ref: 5746.

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Home Counties

up to £8,500 + Car

Our Client is an established Data Terminal manufacturer looking to increase its field engineering resources. Customer Support Engineers are required to maintain an existing range of terminals, VDU's and micro-processors, faulting to component level, in an area encompassing North and East London postal districts and surrounding counties. Initial product familiarisation will take place at the Head Office in the South West. It is likely that the successful applicant is currently enjoying either a field service role or seeking a move to field engineering from R & D, and is qualified to at least ONC level in

Field Service Engineer

London

up to £7,000 + Car To meet the demands of steady growth, our Client – a leading manufacturer in the field of computer peripherals – is in the process of recruiting an experienced Field Service Engineer, Ideally candidates

will be in their mid-twenties and familiar with the faulting of data terminals, VDU's, daisy-wheel and matrix printers to at least board-level. Although emphasis is placed on relevant experience, a formal qualification would be an added bonus. Ref: 5773.

For further information please contact Robert Hogarth quoting the appropriate reference.



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Technical Support Engineers one based in Crawley one based in Kingston

To provide second level support to our customer engineers. You should have at least 5 years' practical knowledge of mini and micro computers with peripheral experience on storage discs, tape units and VDU's. Applicants should either have formal tape units and VDU's. Applicants computer studies or qualifications up to HNC in electronics/computer studies or possess relevant experience.

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To train company and user engineers on all aspects of Rediffusion Computers. You will have at your disposal the Rediffusion Computers. You will have at your disposal the benefits of our fully equipped education centre. The ideal applicant should have at least 3 years' experience working in the applicant should have at least 3 years' experience working in the applicant should have at least 3 years' experience working in the applicant should have at least 3 years' experience working will be given computer/electronics field plus relevant qualifications. Will be given the ability to communicate is essential full training will be given on company products and where appropriate, on teaching techniques.

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Rob Wilson, Personnel Officer,

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on a wet and windy winter

Wednesday (how's that for

So, I hope you will forgive me if I touch upon a frivol-ous topic which, despite its

mmersion into selling . . .

but fundamentally it is a distillation of many people's

Having said all that,

would not claim for a mo-ment that Sod's Law is the

salesman. Programmers i particular will be aware o

he profound significance of

this exact science in their

For instance, any truly

experienced programmer

will know only too well that the error located on page one of the source listing is only located by arriving at the last page having checked every line of code on route.

Moreover, when this er-ror has been corrected, it will eventually be disco-

vered that it was correct in

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own when there is a major systems breakdown or aimilar disaster, for it is a well astablished aspect of this philosophy that any ac-tion taken to resolve an unmitigated mess will certainly make matters worse.

I have mentioned on more

than one occasion in the past the need for adopting the right kind of attitude to-wards the achievement of *PUZZLE* sales success. All we

only too well that negative aspirations bring about negative rewards, whereas positive attitudes bring about negative rewards.
When you really think about ir, Sod's Law has an influence upon most things.
Why, it even affects many readers of Sales Bit. There is

very situation. If you should miss an is-

sue of Computer Weckly (how could life go on?) then it is sure to contain the only Sales Bit you particularly wanted to read. What is more, should such a tragic circumstance come alway, you can be sure that any other reader you contact didn't get it either, lost it or simply threw it away.

apparent lack of relevance to selling, will immediately be recognised by all those who have been baptised by total worth his salt will also be well acquainted with this same philosophy. In a new installation, for instance, Sod's Law is sure to be at Sod's Law has many deri-ations and manifestations, work, for if the equipment i delivered with only one component short, it is store experience, and irrevocably confirms that if anything in to be the one on which the entire implementation is completely dependent.

day-to-day living can pos-aibly go wrong, it will! Indeed, this is only a beginning, for it is a well established fact that if there is a chance of several things going wrong, you can bet your life the one that will do Accidents can occur within any engineering envi ronment, but any computer engineer will tell you that any piece of equipment that is dropped will fall in such a way as to induce the greatest possible damage — a kind of industrial equivalent to the toast always falling butter-side down, which we all he most damage is the one that gets up and hits you in Moreover, should you be smart enough to anticipate all such possibilities and know to be an undeniable fact (that is, of course, with ake avoiding action, then a the exception of circum-stances where the carpet is new and completely unforeeen event is sure to appear dirty and you were going to have it cleaned anyway!). out of nowhere and get you where it hurts most; just when you're thinking how

All experienced computer engineers as well as pro-grammers know that any at-In fact, it is fair to say that in the context of Sod's Law, every solution generates a tempt to trace a hardway fault or program bug after 4pm on a Friday is virtually completely new problem. Remarkably, students of impossible and totally untra-ceable if you happen to have

Sod's Law always manage to wear a smile, which is why true sales professionals always give the impression of being cheerful. This is because they know that there a heavy date that evening. Work as late as you like no chance. However, a fact that is equally predicta-ble is that this clusive prob-iem will be solved within a few nanoseconds when you return to work the following Monday. cause they know that things are bound to be worse to-

There is an additional and perhaps more subtle aspect of Sod's Law that can escape the notice of all but the most never sufficient time avail able really to do any joi properly, but you can al-ways find time to do the job

all over again when you completely screw it up.
Which leads us to that
well-worn and continually
ignored adage: When all else
fails. tread the instruction

So, there you have it — a brief introduction to the vagaries of Sodmanship in the computer industry which I hope will impress careful planning and effi-cient personal organisation when such powerful forces

are abroad.

Don't forget, every puddle is shallow except the one you riesd in.

Alan Williams

ANSWER I

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